THE IRON TRADE REVIEW

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Round Tonnage of Southern Pig Iron Sold

For Delivery Next Year—Heavy Buying in Buffalo — Railroads Place Additional Rail Orders

Positive indications of continuance of active demand manifest themselves throughout the country. Mills in the Chicago district are so congested that promises can seldom be given for delivery prior to Jan. 1, while in the Pittsburgh district, leading makers are finding it increasingly difficult to guarantee delivery before December. Leading producers, whose order books are well filled for the remainder of the year continue their conservative policy of advancing quotations slowly. A number of independent companies, particularly those located in eastern Pennsylvania, which are able to give prompt deliveries on plates, shapes and bars, are getting very handsome premiums. Many jobbers have advanced prices on materials from store $2 per ton.

Pig Iron

Heavy buying, liberal inquiry and advancing prices characterize the pig iron market. The Tennessee Coal, Iron & Railroad Co. has sold 60,000 tons of foundry grades to cast iron pipe makers for deliveries extending through the first quarter of next year on the basis of $12.50 for No. 2. This company is now asking $13 for No. 2 for the first quarter. About 18,000 tons of foundry grades for delivery prior to Jan. 1 were booked on a basis of $12, Birmingham. This tonnage included a round lot for export to Italy. The lowest price being named now on southern iron for delivery this year is $11.75, Birmingham, for No. 2. A number of makers are willing to sell into first quarter at $12.50, Birmingham, for No. 2. The southern Ohio situation is stronger. In steel-making irons, the principal transactions were additional sales of basic in the eastern territory and the making of a contract by a valley interest for the delivery of some 50,000 tons of basic over a period of several years. The purchases of the leading consumer of basic in eastern Pennsylvania for first quarter delivery now aggregate 35,000 tons and the company is in the market for 25,000 tons additional. While recent sales in that territory have been at $16.15 and $16.25, delivered, for first quarter, $16.50 is now being firmly quoted. The inquiry of the Pennsylvania railroad for 10,800 tons of foundry and charcoal irons for delivery at Altoona during the last quarter is the largest inquiry sent out by the company in several years. The company has the reputation of buying more than it inquires for. A central Ohio car manufacturer is in the market for 23,000 tons of malleable and 37,000 tons of northern and southern foundry, for delivery during the last quarter of this year and the first half of next year. Activity continues at Buffalo, where about 75,000 tons were sold during the week.

Railroad Buying

Although no serious difficulty has yet been experienced in getting cars, there are complaints on the part of some shippers and it is probable that there will be much more trouble at a not far distant date. Leading railroads are inquiring freely for rails for next year and the rail market is fairly active. The principal purchases to date have been 75,000 tons by the Northwestern and 40,000 tons by the Burlington, while the Atchison and St. Paul railroads have practically closed for about 50,000 tons each. Inquiries include 25,000 tons for the Harriman lines, 15,000 tons for the Northern Pacific, and 15,000 to 20,000 tons for the Great Northern. The Argentine & Northeastern railway has awarded 12,000 tons of rails to the United States Steel Products Co. The Canadian-Pacific has placed additional orders for 5,000 cars with Canadian builders. The steel will be furnished by the United States Steel Corporation.

Shapes and Plates

Leading eastern makers of structural material have advanced their quotations. Orders for shapes and plates continue to come in freely. Structural lettings in the New York district have been numerous and, including several which it has fully been expected would be awarded to the American Bridge Co., have aggregated about 50,000 tons. Among the contracts taken by this company are 14,000 tons for the Biltmore hotel, 10,000 tons for the Western Union building, both in New York, and 5,500 tons for an addition to the building of the Curtis Publishing Co., and 3,500 tons for the Hotel Adelphia, both in Philadelphia. The awarding of 91,000 tons of structural material, with an option of 50,000 tons additional, by the Brooklyn Rapid Transit Co. has been delayed and may not take place for some time.

Cast Iron Pipe

Owing to the advancing prices of pig iron, makers of cast iron pipe have advanced their prices about $2 per ton. Milwaukee has awarded 5,000 tons water pipe to the north Birmingham plant of the United States Cast Iron Pipe & Foundry Co.

PITTSBURGH

Market Continues to Gain in Strength

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The market for all lines of steel products has developed additional strength during the past week. Prices are much firmer for all materials, and no difficulty has been experienced in establishing advanced quotations where advances have been made. Specifications against contracts have not fallen off this month and inquiries for additional material are equally as heavy as those of July. Consumers are specifying to the limit of their contracts and in many cases additional tonnages are requested. The leading steel manufacturers in this district continue to refuse premium prices, although some of the mills are booking considerable tonnage at quotations above those generally prevailing. More than usual effort is being made by the leading plate and bar makers to prevent speculative tonnages being entered upon their books and it is not infrequent to have tonnages reduced to meet the more conservative views of the mills. Fairly good inquiry for all grades of pig iron continues, although most of the heavy consumers are well covered for requirements through the remainder of the third and fourth quarters. Prices are firm and early advances in values are predicted for some grades. Blue annealed sheets have been advanced from 1.45c to 1.50c for No. 10 gage, and mills in a position to assure prompt delivery have obtained premiums of $1 a ton. Most of the independent mills are asking 1.40c for steel plates and structural shapes, although this price is not as yet general. There is unusually heavy demand for wire products and tin plate, especially for this season of the year, and increases in the price value of both products are talked of in the trade.

Pig Iron.—There is indication that advances in price values will be made in the near future on nearly all grades of pig iron. Notwithstanding the fact that the heaviest consumers covered requirements earlier in the year, there has been rather heavy inquiry for iron for delivery through the third and fourth quarter. Stocks are extremely low, and furnace operators report that there is but little more available pig iron for this year's consumption. Some of the sellers of Bessemer iron have refused to quote below $14.75, valley, for delivery the remainder of the year and in one or two instances $15, valley, has been asked. No sales, however, are reported above $14.50, valley, for this year's delivery. Foundry iron is firm on the basis of $14, valley furnace, for third and fourth quarter deliveries. There have been small tonnages of foundry iron sold for first quarter delivery, and one transaction is reported to have been closed at $14.25, valley, although this sale is not at all indicative of the future market, as it was made under unusual circumstances. Considerable interest has been taken in the Pennsylvania railroad inquiry, which calls for 10,600 tons of foundry and charcoal iron for this year's delivery at its Altoona, Pa., shops. The Pittsburgh Steel Co., which entered the market at the close of last month for approximately 100,000 tons of basic iron, is reported to have obtained an additional tonnage a few days ago at $13.85, valley, although nothing definite has been announced regarding this transaction. Small tonnages of malleable iron have been sold at $14, valley, for delivery the remainder of the year, and gray forge iron continues firm at $13.50, valley furnace. Midland furnace, of the Pittsburgh Crucible Steel Co., located at Midland, Pa., which has been in continuous operation for six years, will blow out early this fall for relining and repairs. Josephine No. 2 stack, of Corrigan, McKinney & Co., at Josephine, Pa., was lighted last week, and it is reported that the Valley Mold & Iron Co.'s furnace at Sharpsville, Pa., which has been out of blast two years, will resume operations shortly. No. 4 stack of the Jones & Laughlin Steel Co., at Aliquippa, Pa., which was damaged by an explosion, is being repaired and will be re-lighted before the end of the month. Buying for first quarter delivery will begin early in September, it is believed, although thus far sellers have shown no inclination to consider contracts extending beyond the fourth quarter.

Pig iron quotations for prompt and future shipments are as follows:

(Prompt Shipment.)

Bessemer, valley	$14.50
Bessemer, Pittsburgh	15.40
Basic, valley	14.00
Basic, Pittsburgh	14.90
No. 2 foundry, Pittsburgh	14.90
Gray forge, Pittsburgh	14.40
Malleable, Pittsburgh	14.90

(Fourth Quarter.)

Bessemer, valley	$14.50
Bessemer, Pittsburgh	15.40
Basic, valley	14.00
Basic, Pittsburgh	14.90
No. 2 foundry, Pittsburgh	14.90
Gray forge, Pittsburgh	14.25
Malleable, Pittsburgh	14.90

Ferro-Alloys.—The price of ferro-manganese continues to be $51, Baltimore, for extended contracts, and $52, for prompt delivery. Fifty per cent ferro-silicon is quoted at $72.50, Pittsburgh, for both prompt and future delivery. Most of the consumers of both ferro-manganese and ferro-silicon are well covered for requirements through the remainder of the year, although inquiries for small tonnages have come out during the past week. Shipments are deferred several weeks.

We quote 80 per cent ferro-manganese at $52, Baltimore, for prompt delivery and $51 for forward shipment. The freight rate from Baltimore to Pittsburgh is $1.95 per ton.

Fifty per cent ferro-silicon is quoted nominally at $72.50, Pittsburgh, for prompt and forward delivery; 12 per cent, $22; 11 per cent, $21; 10 per cent, $20, f. o. b. Globe, Jisco and Ashland furnaces. The freight rate to Pittsburgh is $1.90. The foreign grades are held at $1 or more a ton over domestic prices.

On ferro-titanium we quote 8 cents per pound for carload lots; 10 cents per pound for 2,000 pound lots and over, and 12½ cents per pound in lots up to 2,000 pounds.

Plates.—Following an announcement a week ago that some of the plate makers had refused to accept below 1.40c for delivery this year, other independent manufacturers have withdrawn former quotations and are also asking $1 more a ton for both steel plates and structural shapes. This price, however, is not general, as the leading interest and one of the most prominent independent makers continue to ask the minimum quotation. One of the plate manufacturers obtained 1.50c, Pittsburgh, on several small tonnages where prompt delivery was possible. The demand for steel plates continues heavy, and

one of the important makers has practically withdrawn from the market. Mills have guarded against speculative tonnages being entered upon their books, and have reduced tonnages to meet actual needs in many instances. Shipments are deferred from between two and three months. It is reported that the Pennsylvania lines west, which recently closed contracts for 1,500 automobile cars, soon will be in the market for as many more cars, although no official inquiry has been made as yet. The Baltimore & Ohio railroad which recently placed an order for steel underframes and repairs to 500 box cars with the American Car & Foundry Co.'s plant at Huntington, W. Va., is also reported to be considering a further order. The Southern Railway Co. has closed for 30 coaches, having placed orders for 25 coaches with the Pullman Car Co., Chicago, and for five coaches with the Standard Steel Car Co. Car shops in this district are running at maximum capacity, but are unable to make shipments in less than two months.

Plates are quoted at the following prices:

Tank plates, ¼ inch thick, 6¼ to 100 inches, 1.35c to 1.40c. Extras are as follows per 100 pounds: Boiler and flange steel plates, 0.10c; A. B. M. and ordinary firebox steel plates, 0.20c; still bottom steel, 0.30c; marine steel, 0.40c; locomotive firebox steel, 0.50c; all sketches excepting straight taper plates varying not more than 4 inches in width at ends, narrowest end being not less than 30 inches 0.10c; circles, 0.20c. Plates in widths over, 100 inches up to 110 inches 0.05c; over 110 inches up to 115 inches, 0.10c; over 115 inches up to 120 inches, 0.15c; over 120 inches up to 125 inches, 0.25c; over 125 inches up to 130 inches, 0.50c; over 130 inches, 1c. Gages under ¼ inch to and including $\frac{1}{16}$-inch plate on thin edge, 0.10c; under $\frac{1}{16}$ and including No. 9, 0.25c. Five cents extra for less than carloads. Terms net cash in 30 days.

Sheets.—The American Sheet & Tin Plate Co. last week announced an increase of $1 a ton in the price of blue annealed sheets, changing the basis of No. 10 gage from 1.45c to 1.50c, and most of the mills that had not been asking this price quietly advanced quotations correspondingly. Some of the independent mills have been obtaining 1.50c for some time, and it is reported small tonnages have been sold above this figure when early shipment was possible. The leading interest is six or seven weeks behind in shipments of blue annealed products and will not benefit directly from increased quotations until the early part of October. Black sheets are firm at 2.05c for No. 28 gage, and galvanized products have been firmly established on a basis of 3.15c for No. 28 gage. An Ohio maker, in a position to assure rather prompt delivery, reports small tonnages of galvanized sheets at $1 above the prevailing quotation. Leading makers are unable to promise shipments of galvanized sheets in less than nine or ten weeks. All of the mills are running at capacity, but the output far from equals the demand. There have been numerous attempts to place contracts for next year's delivery, but mills have hesitated about accepting business extending into 1913. We quote:

Flat Sheets.

Black Sheets.—Nos. 10-12 gage, $1.70 per 100 pounds; Nos. 13-14 gage, $1.75; Nos. 15-16 gage, $1.80; Nos. 17-21 gage, $1.85; Nos. 22-24 gage,$1.90; Nos. 25-26 gage, $1.95; No. 27 gage, $2.00; No. 28 gage, $2.05; No. 29 gage, $2.10; No. 30 gage, $2.20.

Tin mill sizes base 5 cents per 100 pounds under these prices.

Blue Annealed.—Nos. 3-8, $1.45 per 100 pounds; Nos. 9-10, $1.50; Nos. 11-12, $1.55; Nos. 13-14, $1.60; Nos. 15-16, $1.70.

Galvanized.

Nos. 10-11 gage, $2.15 per 100 pounds; Nos. 12-14 gage, $2.25; Nos. 15-16 gage, $2.40; Nos. 17-21 gage, $2.55; Nos. 22-24 gage, $2.65; Nos. 25-26 gage, $2.85; No. 27 gage, $3.00; No. 28 gage, $3.15; No. 29 gage, $3.25; No. 30 gage, $3.45.

Roofing Sheets.

Net extras on all gages per 100 pounds. Corrugated 2-inch, 2½-inch, 3-inch and 5-inch corrugation, 5c; 2 V crimped without sticks, 5c; corrugated 1¼-inch corrugation, 10c; 3 V crimped without sticks, 10c; pressed standing seam with cleats, 15c; plain roll roofing with or without cleats, 15c.

Painted Roofing.

12 to 18 gage, inc., 5c; 19 to 24 gage, inc., 10c; 25 to 28 gage inc., 15c.

Tin Plate. — The demand for tin plate continues heavy, many of the consumers who usually wait until early fall to place orders already having entered the market for material for delivery the latter part of the year. Early buying is making it impossible for the mills to accumulate stocks, and despite the fact that this year's output of the mills promises to exceed that of 1911 by at least 20 per cent, the supply does not equal the demand. Wherever possible, the hot tin mills are operating at maximum capacity, although some complaint is heard about the difficulty of obtaining sufficient steel. There has been considerable effort on the part of anxious buyers to place orders for next year, but as yet none of the sales agents has shown any inclination to consider contracts for requirements beyond 1912. Frequent reports of an increase of 10 cents a box in the base price of coke tin plate are heard. Rumors that gained wide circulation the latter part of last week to the effect such an advance in price value had been made by the leading interest proved to be unfounded. Although advanced quotations are probable, the leading interest is silent regarding any change.

The following quotations continue:

Coke tin plate, 100-pound basis, 14 x 20, $3.50, f. o. b. mill, Pittsburgh district.

Rails and Track Material.—Preparations being made by the railroads throughout the country to move this year's crops are reflected in the present heavy demand for rails and track material. Although most of the roads covered estimated requirements for the year some time ago, many of them have re-entered the market for additional equipment, and buying for emergency purposes by both steam and electric roads has been unusually heavy. There has been considerable demand for light rails, and heavy tonnages are being shipped each week to the coal fields. As yet, none of the mills has accepted tonnages for next year's delivery, although buying for 1913 requirements is reported to be heavy in other territories. Most of the leading makers of standard spikes are from 60 to 90 days behind in deliveries, and shipments are more deferred at present than they were several weeks ago. Jobbers' stocks are at low ebb, and many of them have been placed in embarrassing positions because of deferred mill shipments. Sales agents have received telephone and telegraphic calls, urging shipments. Anxious buyers have attempted to place orders for 1913 delivery, but there has been no tendency on the part of the mills to book tonnages for next year's shipment. Both the Bessemer and open-hearth rail mills have enough tonnage on their books to keep them running at maximum capacity the remainder of the year and in some instances into next year.

Rails are quoted as follows, with the base price on open-hearth standard sections 1.34c per pound at the mill:

Fifty-pound and heavier, 1.25c per pound; carloads and less than 500 tons, 1.34c per pound; light rails on base weight of 40 to 45 pounds; 1.19c, the schedule on the other weights being irregular and subject to negotiations; angle bars for standard sections, 1.50c, Pittsburgh; track bolts, 2.00c to 2.10c, Pittsburgh.

Railroad Spikes.

4½, 5 and 5¼ and 9-16	$1.65 to 1.70
3, 3½, 4, 4½ and 5 x ½	.10
3½, 4 and 4½ x 7-16	.20
3, 3½, 4 and 4½ x ⅜	.30
2½ x ⅜	.40
2½, 3 and 3½ x 5-16	.60
2 x 5-16	.80

Billets.—Recent sales of Bessemer billets and sheet and tin bars have indicated the present strength of the semi-finished steel market. One of the few mills in a position to make sales at present reported a sale of 4 x 4-inch Bessemer billets last Monday at $23, Youngstown, and it is believed it is no longer possible to obtain such material at less than $22.50 or $23. Bessemer sheet and tin bars have been bringing higher prices than were obtainable a week ago, one steel mill reporting a sale between $23 and $23.50,

Pittsburgh, early this week. There is an acute scarcity of all grades of semi-finished material. Three of the largest manufacturers of billets are out of the market, being unable to produce any surplus tonnage, and it is reported some of the semi-finished steel makers are unable to roll enough material for their own use. Open-hearth billets are firm at $23 to $23.50, and open-hearth sheet bars continue to bring $23.50 to $24, f. o. b. Youngstown and Pittsburgh.

Bessemer 4 x 4 billets with 0.25 carbon and less are quoted at $22.50 to $23, with the usual extra for size and analysis, and open-hearth rolling billets, $23 to $23.50. Bessemer sheet and tin bars are quoted at $23.00 to $23.50, and open-hearth sheet bars are quoted at $23.50 to $24.00, f. o. b. Pittsburgh and Youngstown for third quarter, with full freight to destination added. Forging billets are quoted at $28.00 to $29.50, Pittsburgh.

Hoops and Bands.—Although hoops are regularly quoted at 1.40c, most of the mills have been getting as high as 1.45c and 1.50c, Pittsburgh. Sales agents have been refusing to sell bands at less than 1.30c, and several sales at 1.35c have been made, where prompt delivery was assured. It would be difficult to obtain this product at 1.25c, the price which prevailed several weeks ago. The demand for both steel hoops and bands continues heavy. Quotations are as follows:

Hoops in carload lots, 1.40c, Pittsburgh; in less than carload lots, 1.50c; bands 1.30c, base, with net extras, as per standard steel.

Merchant Bars. — Makers of iron and steel bars report that the demand continues heavy, in spite of the fact that the majority of consumers covered requirements months ago. Bolt and rivet makers, automobile manufacturers, car shops and the railroads have been placing heavy tonnages with the mills, and it no longer is a question of prices that is of most vital interest to the buyers. Consumers have been specifying to the limit on their contracts and in many instances they have attempted to obtain additional tonnage, offering premiums ranging between $1 and $4 a ton. One of the independent mills, not usually a factor in the bar market, last week sold a small tonnage at between $4 and $5 a ton above the prevailing quotation, 1.30c. Considerable effort has been made to place tonnage for delivery the first quarter, but sales agents have been directed not to accept contracts extending beyond the fourth quarter. Effort is made on the part of the leading bar makers to prevent speculative tonnage being entered upon mill books, and in many instances tonnages are reduced considerably. Shafting is firmly established on the basis of 64 per cent off for car load lots and 59 per cent off for less than car load lots. Shafting was slow in responding to the recent advance in price value, primarily due to the fact that jobbers, who obtained considerable stock early in the year at prices much lower than those now prevailing, were able to shade mill quotations. Jobbers' stocks have declined considerably this month, and reports of price shading have entirely disappeared. Iron and steel bar quotations are as follows:

Common iron bars, 1.40c to 1.45c. Pittsburgh; Bessemer and open-hearth steel bars, 1.30c; plow and cultivator, 1.30c, channels, angles, zees, tees, under 3 inch, 1.30c, all f. o. b. mill. The following differentials are maintained on steel: Less than 2,000 pounds of a size, 0.35 advance. Cold rolled, and ground shafting, 64 per cent off in carloads and 59 per cent in less than carloads, delivered in base territory.

Muck Bar.—Very little muck bar is being offered. Most of the producers are using their output in the finishing mills and have no surplus tonnage to sell. Quotations are nominally given at $30 and $31, Pittsburgh, on all grades of pig muck bar.

Structural Shapes. — Fabricators in this district continue to receive fairly good bookings, although few contracts were closed during the past week. Fabricating shops are running at capacity, but considerable difficulty has been experienced in obtaining sufficient labor. One of the largest independent fabricating shops in this district has been unable to operate at maximum capacity for some time on account of a crippled power plant, but it is reported that necessary repairs have been made and that the plant will be operating at capacity very shortly. The American Bridge Co. has closed a contract with the Atlanta Realty Co., Atlanta, Ga., for an office building, requiring 2,000 tons of steel. Revised bids on the Aspinwall pumping station, near Pittsburgh, have been asked. No large undertakings are reported locally, although general satisfaction is expressed by fabricators and erectors. Several of the independent manufacturers of structural shapes in this district have advanced price values to 1.40c, Pittsburgh, although this quotation is not general, some of the most prominent makers continuing to ask 1.35c. Considerable complaint is heard from the fabricators on account of deferred mill deliveries, which are three months behind in some instances. The following prices are firm:

Beams and channels, 15 inches and under, zees, 1.35c to 1.40c; tees, 1.35c to 1.40c; angles, from 3 to 6 inches, 1.35c to 1.40c; over 6 inches, 1.40c to 1.45c; universal and sheared, 1.35c to 1.40c; over 15 inches, 1.40c to 1.45c; plates, 6¼ inches wide and wider, 1.40c to 1.45c.

Merchant Pipe.—Steel and iron pipe makers in this district have enough orders on their books to keep their mills operating at capacity two or three months, and several of the leading makers have practically withdrawn from the market. Jobbers' stocks are at low ebb and mills are being urged for shipments. Makers demanding maximum quotations are having no trouble in obtaining tonnages. No large contracts have been closed this week and there are no especially important inquiries pending. It is reported that many buyers have attempted to transfer orders, in an effort to obtain tonnage, but have found it almost impossible to get deliveries in less than two months. Considerable steel pipe has been sold at prices higher than those provided in the official list.

Discounts to jobbers, subject to the usual preferential discount to the large buyer, are as follows:

Iron and Steel Pipe Basing Prices.

	Steel.		Iron.	
	Butt weld.			
	Black.	Galv.	Black.	Galv.
⅛, ¼ inch.....	72	52	68	48
⅜ inch	73	63	69	53
½ inch	76	66	72	59
¾ to 1½ inch.....	79	71	75	64
2 to 3 inches	80	73	76	65
	Lap weld.			
2 inches	77	70	72	63
2½ to 4 inches.....	79	72	74	66
4½ to 6 inches.....	78	70	73	65
7 to 12 inches.....	76	66	71	61
13 to 15 inches.....	53	..	47	..
Extra Strong, Plain Ends.				
	Butt weld.			
⅜, ¼, ⅛ inch.....	68	58	65	55
½ inch	73	67	70	63
¾ to 1½ inch.....	77	71	74	65
2 to 3 inches	78	72	75	66
Extra Strong, Plain Ends.				
	Lap weld.			
2 inches	74	68	71	63
2½ to 4 inches.....	76	70	74	66
4½ to 6 inches.....	75	69	72	65
7 to 8 inches	68	58	65	55
9 to 12 inches.....	63	53	60	50
Double Extra Strong, Plain Ends.				
	Butt weld.			
½ inch	63	57	60	52
¾ to 1½ inch.....	66	60	63	55
2 to 3 inches.....	68	62	65	57
Double Extra Strong, Plain Ends.				
	Lap weld.			
2 inches	64	58	61	52
2½ to 4 inches.....	66	60	63	57
4½ to 6 inches.....	65	59	62	56
7 to 8 inches.....	58	52	55	45

Plugged and reamed pipe is furnished at 2 points higher price, either butt or lap weld.

The above discounts are for full weight pipe, subject to a variation of 5 per cent. merchant pipe, when specified, being furnished up to 6 inches at one point higher discount (lower price).

Boiler Tubes. — Demand for steel and iron boiler tubes continues heavy, and recent advances in prices have been established without difficulty. Mills are from 10 to 12 weeks deferred in shipments, and one of the most important steel boiler tube makers has been forced temporarily to withdraw from the market because of inability to accept further tonnages. Some of the independent boiler tube makers have been asking

premium prices and consumers who are anxious to secure prompt shipments have not hesitated about paying more than the regular quotations. Official discounts on iron and steel boiler tubes are as follows:

	Steel	Iron
1½ inch	59	47
1¾ to 2¼ inch	63	48
2½ inch	65½	53
2¾ to 3¼ inch	70½	55½
3½ to 4½ inch	73	58
5 and 6 inch	65½	48½
7 to 13 inch	63	..

To destination east of Mississippi river will be sold at delivered discount for carloads lowered by 2 points, for lengths 22 feet and under; longer lengths, f. o. b. Pittsburgh. Usual extras to jobbers and boiler manufacturers.

Wire. — Because of the unusually early buying of wire products, mills in this district realize they will be unable to meet the demand that comes in the early fall on account of having had no opportunity to build up stocks. For the first time in several years, there has been a steady stream of orders coming to the mills ever since early spring, and the continued heavy buying has made it impossible for the wire mills to prepare for the future. Jobbers' stocks are very much depleted. Although an advance in price of wire products has been discussed, there has been no change, and quotations remain as follows:

Wire nails, jobbers' carload lots, $1.60 to $1.65; retailers' carload lots, $1.65 to $1.70; cut nails (western makers), jobbers' lots, $1.60 to $1.65, painted barb wire, jobbers' carload lots, $1.65 to $1.70; retailers' carload lots, $1.65 to $1.70, with 30c for galvanizing; plain wire to jobbers in carloads, $1.40 to $1.45; and to dealers, in carloads, $1.45 to $1.50; polished staples, $1.60 to $1.65; galvanized staples, $1.90 to $1.95.

Wire Rods.—Wire rods are somewhat stiffer in price than they have been for several weeks. One of the most important makers has refused to sell either open-hearth or Bessemer products at less than $27, Pittsburgh, although some of the mills have been accepting contracts for the latter grade at $26. Mills report that specifications against contracts continue heavy. We continue to quote Bessemer rods at $26 and open-hearth rods at $27, Pittsburgh.

Coke.—Sales of Connellsville furnace coke for prompt delivery aggregated between 200 and 300 cars last week, it is estimated by coke producers and sellers who have kept in close touch with the market. Most of the sales closed at $2.25, ovens, although one sale of about 4,000 tons was made at $2.30, ovens. Developments have more than indicated the position of the market for prompt fuel. From reported sales in the Uniontown district it is generally believed $2.25, ovens, is the minimum quotation for coke over the rest of the year, although producers who have been making sales at this price stood out for $2.50 coke several weeks. Although it is claimed that no contract coke has been obtained at $2.25, reports from furnaces to close negotiations within the past few days have removed any possible doubt regarding these transactions. Several of the sellers have refused to close contracts at less than $2.35 or $2.40 for delivery this year, but no sales are reported at the maximum quotation. Eastern consumers, who have been embarrassed because of deferred shipments, have been entering the market for a second time this year, and in several instances have paid $2.25, ovens, for coke that was contracted for at as low as $1.70. The coke production for the week ending Aug. 10, according to the *Connellsville Courier*, was 385,957 tons, a gain of 6,810 tons over the week before. Furnace ovens increased 2,742 tons and merchant ovens gained 4,068 tons. Shipments made a gain of 82 cars. We quote:

Connellsville	furnace	$2.25 to 2.30
Connellsville	furnace contract	2.25 to 2.35
Connellsville	foundry	2.60 to 2.75
Connellsville	foundry contract	2.60 to 2.75

Old Material.—The iron and steel scrap market has remained unchanged for several weeks, although prices are firm. There has been a fairly heavy demand for heavy melting steel, but dealers have found it impossible to obtain more than the minimum market quotation. Mills have been buying heavily from the railroads, and have not had to depend upon middlemen for material. Stocks from outside towns are moving slowly, small dealers having decided to await market developments, believing that better prices will prevail in the near future. We quote, gross tons, delivered in the Pittsburgh district, including Steubenville, Brackenridge and Follansbee, as follows:

Heavy melting scrap	$13.50 to 13.60
Rerolling rails	14.25 to 14.50
Malleable	12.75 to 13.00
Bundled sheet scrap	12.00 to 12.25
Iron axles	23.00 to 24.00
Old iron rails	15.50 to 16.00
Stove plate	10.00 to 10.50
No. 1 wrought scrap	14.00 to 14.25
Old car wheels	14.00 to 14.50
Low phosphorus	16.00 to 16.25
Machine shop turnings	10.75 to 11.00
Cast borings	10.00 to 10.25
No. 1 cast scrap	13.25 to 13.50

ST. LOUIS

Good Inquiry for Pig Iron

Office of THE IRON TRADE REVIEW,
St. Louis, Aug. 20.

Pig Iron.—Sales and inquiries at St. Louis are indicative of a good buying movement and exceptionally bright prospects for pig iron, with stiffening prices. Sales reported today include 6,000 tons of low silicon malleable, part of a 10,000-ton inquiry reported last week; 1,000 tons of northern No. 1, for first quarter delivery at $13, and 6,000 tons of malleable, for which no general inquiry was out. The 1,000 tons of northern No. 3, at $13, for first quarter has excited considerable interest. Inquiries are out for 2,000 to 3,000 tons of car wheel iron for St. Louis delivery; 1,000 tons southern No. 2, for a plant in Dubuque, Ia.; 2,000 tons southern No. 2; 1,000 tons of southern No. 3, for first half delivery at St. Louis; 5,000 tons of analysis iron, that would include both northern and southern, and 5,000 tons of southern No. 2, for a nearby plant.

While southern No. 2 is reported firm at $12, Birmingham basis, it is admitted that small tonnages for quick shipment might be had at a little less. One sale of 1,000 tons southern No. 2 was made today at $13 for second half. Northern iron is firm at $14, f. o. b., Ironton.

Our tabulated prices on southern iron, to which the Birmingham freight of $3.75 has been added, follow:

Southern No. 1	$16.00 to 16.25
Southern No. 2	15.50 to 15.75
Southern No. 3	15.00 to 15.25
Southern No. 4	14.75 to 15.00

Coke.—Sales of coke in the last few days include 25 cars Connellsville foundry, for delivery over the remainder of the year; 12 cars of Connellsville foundry, delivery over this year; 10 cars Connellsville foundry, for a Texas plant, 12 cars Connellsville foundry, 7 cars of same grade, St. Louis delivery, and still another 15 cars of same grade for St. Louis, 2,600 tons of Virginia coke, and 600 tons of West Virginia grades. Inquiries are out for 40 to 50 cars of Connellsville foundry.

Our tabulated prices on coke follow:

We quote 72-hour Connellsville foundry grades, $2.50 to $2.75 for immediate shipment or delivery through the year; 48-hour Connellsville furnace, $2.25 to $2.40; best 72-hour Virginia foundry, $2.50 to $2.75; 48-hour Virginia furnace, $2.00 to $2.40. The freight to East St. Louis and St. Louis is $2.80, and $2.70 from the Virginia fields when shipment is destined beyond St. Louis.

Finished Material. — The Wabash railroad is in the market for a smith-shop and other buildings at Decatur, Ill., calling for about 2,000 tons of steel, and the city of St. Louis is

asking for prices for about 700 to 800 tons of steel to be used in completing the western approach to the Municipal bridge. A lot of office building work calling for small tonnages of steel is going on. Steel bars are firm at 1.30c, Pittsburgh, and structurals at 1.35c to 1.40c, Pittsburgh, and are hard to obtain for immediate wants.

Old Material.—The scrap iron market is quiet, with prices unchanged as follows:

Gross Tons.

Old car wheels	$14.50 to 15.00
Old iron rails	15.25 to 15.50
Re-rolling rails (5 ft. and over)	12.50 to 13.00
Old steel rails (3 ft. and under)	11.50 to 12.00
Light section relayers (45 lb. and under) subject to inspec.	21.50 to 22.50
Relaying rails, subject to inspec.	23.00 to 23.50
Frogs, switches and guards	9.50 to 10.25
Heavy melting steel	11.00 to 11.50
Shoveling steel	9.75 to 10.25

Net Tons.

No. 1 railroad wrought	$11.50 to 12.00
No. 2 railroad wrought	10.50 to 11.00
Arch bars and transoms	13.25 to 13.50
Knuckles, couplers and springs	9.50 to 10.00
Shafting	13.00 to 13.50
Iron car axles	18.50 to 19.00
Steel car axles	16.50 to 17.00
Locomotive tires	10.50 to 11.00
No. 1 country wrought	9.00 to 9.50
Pipe and flues	8.00 to 8.50
Tank iron and cut boilers	8.00 to 8.50
No. 1 cut busheling	9.50 to 10.00
No. 2 cut busheling	8.50 to 9.00
Cast and mixed borings	6.75 to 7.25
Machine shop turnings	7.50 to 8.00
Railroad malleable	10.00 to 10.50
Agricultural, malleable	9.00 to 9.50
Stove plates	8.50 to 9.00
Angle splice bars (iron)	10.75 to 11.50
Angle splice bars (steel)	9.00 to 9.50

CHICAGO

Finished Material Deliveries Long Delayed

Office of THE IRON TRADE REVIEW,
1328 Monadnock Blk., Aug. 20.

Subsidiaries of the Corporation in this district are having even greater difficulty in satisfying the demands of consumers, Jan. 1 being the earliest time that delivery can be promised. In some lines, notably structural material, it will be impossible to book any new contract tonnage for January and many specifications have been received that will run into February and March. Independent producers are experiencing parallel conditions and the unfilled tonnage in this territory on the first of January will be very large. No contracts for 1913 are being considered and as the mills are full for the remainder of the year, quotations on finished lines are nominal. On account of the pronounced congestion in this district independent producers who operate eastern mills are able to divert small tonnages to them.

Pig Iron.—Efforts are being made by southern furnaces to strengthen the market for last quarter delivery in order to support a further advance on requirements for the first quarter of next year. Some producers are asking $12.50, Birmingham, for last quarter and it is understood that small sales have been made at that figure. In other cases, the furnaces are asking $12.25 for No. 2 foundry, delivered through the last quarter, with higher quotations on other grades. One sale reported at $12.50, Birmingham, for last quarter covers iron 2.50 and over in silicon and 0.40 and over in manganese. The bulk of the business in strictly No. 2 foundry is still being transacted at $12, Birmingham, for the remainder of the year. Inquiry for southern iron for first quarter delivery is very active and small sales to favored customers on a basis of $12.50, Birmingham, have been made. No southern producers, however, are openly in the market for the coming year and no quotations have been established. Strong interests are quoting $13, Birmingham, for first quarter, and although no sales have been made, it is thought that the southern stacks will come into the market at that figure. Northern iron for first quarter delivery is now uniform at $16, f. o. b. local furnaces, although no material tonnage has yet been placed the bulk of the first quarter iron having been sold on the old basis of $15.50, local furnace. Northern iron for the rest of the year is firm at $15.50, local furnace, and no further shading of quotations is evident. While the demand for all grades is very strong and sales are reported for much better tonnages, melters feel no necessity for haste in covering for their requirements, as no further advance is expected in the near future. A number of sales, however, in lots ranging from 500 to 2,000 tons, have recently been made at $15.50. A large user of malleable Bessemer is reported to have covered for about 30,000 tons to be delivered through the last quarter, and the first quarter of next year.

There is a continuation of fair inquiry for immediate delivery and as many melters feel that higher prices will eventually materialize, there is considerable speculative buying.

The following prices represent the market for the remainder of the year, except northern foundry and malleable Bessemer, which are quoted f. o. b. local furnaces:

Lake Superior Charcoal	$16.75
Northern foundry No. 2	15.50
Southern foundry No. 2	16.35
Southern Silv'res, 5 per cent sil.	17.40
Jackson co. sil'v'r's 8 per cent	18.40
Malleable Bessemer	15.50
Alabama basic	16.35

Billets.—Conditions in the billet market are continually made worse by increasing congestion in finished lines. The inability of producers in this territory to take on additional tonnage, coupled with the high premiums which are offered freely, make the present quotations purely nominal. Consumers continue to secure a large part of their requirements from eastern sources, as only very small lots can be placed in the west. We quote, open-hearth forging billets, $31; re-rolling billets, $27.

Merchant Bars.—The expectation that specifications for this material during August would equal the total for previous months seems to be fully justified and the market is very firm at present quotations. Some independent producers are able to take very small lots at from 1.30 to 1.35c. This, however, does not establish the market at that figure, as no material tonnage can be placed in this territory below 1.40c. Beyond the constantly increasing flood of specifications, there is no change in the market for steel bars and as western producers are unable to take business for this year, the present quotations are nominal, particularly as 1913 business will undoubtedly be placed at a higher figure. The mills are adhering firmly to their policy of refusing contracts

for next year's requirements. Warehouses are having increasing difficulty with deliveries and store prices are very firm.

We quote, f. o. b. Chicago, as follows:

Bar iron, 1.40c to 1.45c, hard steel bars, rerolled, 1.35c to 1.40c; soft steel bars, bands and small shapes, 1.48c; hoops, 1.58c; smooth finished machinery steel, 1 inch and larger, 1.78c; shafting 64 per cent off list for carload lots, 59 per cent off for less than carloads.

On iron and steel from local stock, we quote as follows:

Bar iron, 1.80c per pound base; soft steel bars, 1.80c per pound base; soft steel hoops, 2.05c, full extras.

Structural Material.—Specifications for shapes reflect conditions in other lines and a considerable tonnage has been booked by subsidiaries of the Corporation that will run far into next year. Contractors are having trouble in obtaining prices on which to base bids for work during the winter and many large structural contracts are being held up on this account. Subsidiaries of the Corporation are unable to make deliveries on specifications earlier than January and it is certain that they will not be able to book any new business for delivery at that time. There is a shortage of store material in an increasing number of shapes and sizes and small contractors cannot be certain of delivery at any time, as the jobbers have so many unfilled orders on hand that it is impossible to estimate the tonnage called for. Structural contracts let during the week total 11,246 tons, of which the American Bridge Co. has taken 2,668 tons from the Chicago, Milwaukee & St. Paul Railway Co. for the Sage Creek viaduct. The St. Paul Foundry Co. has taken 227 tons from the Kitchi Gammi Club, of Duluth, and the Treadwell Construction Co. has taken 2,500 tons from Los Angeles, Cal., for a steel pipe siphon for the Los Angeles aqueduct. The Strobel Steel Construction Co. has taken three contracts from the Chicago, Milwaukee & St. Paul Railway Co., consisting of 452 tons for pony truss spans; 914 tons for the Coulee viaduct and 985 tons for the Belt Creek viaduct. Milliken Bros. have taken 2,000 tons for the St. Francis hotel annex, San Francisco, and 1,500 tons from the Pacific Gas & Electric Co., for tower construction.

We quote, mill prices, f. o. b. Chicago, as follows:

Beams and channels, 15 inch and under, 1.53c. For extras, see Pittsburgh report.

Store prices are as follows:

All angles, 3 inches and larger, including 6 inches, $1.90 per 100 pounds; angles over 6 inches, $1.95 per 100 pounds, base; beams, 3 to 15 inches, inclusive, $1.90 per 100 pounds, base; channels, 3 inches and larger, $1.90 per 100 pounds, base.

Rails and Track Fastenings.—It is understood that a contract for approximately 80,000 tons of rails for delivery during 1913 has been placed by a western road and inquiries for even larger tonnages are in the market. The Great Northern is in the market for its 1913 requirements, but no definite action has been taken as yet. The tonnage of track fastenings called for in the specifications is even larger and there is considerable complaint on the part of the railroads regarding deliveries which are being delayed by mill congestion. Practically no new business has been placed in this territory and as the mills are unable to make deliveries on specifications earlier than January, it is certain that the total of unfilled tonnage carried over into the new year will be very large.

We quote, light rails f. o. b. Chicago, and track fastenings, f. o. b. Joliet, as follows:

Light rails, carloads, 25 to 45-pound, 1.20c to 1.25c; 16 to 20-pound, 1.25c to 1.30c; 12-pound, 1.30c to 1.35c; 8-pound, 1.35c to 1.40c.

Light section relayers, 45 pounds and under, subject to inspection, $21 to $23; standard section relaying rails, subject to inspection, $22 to $23.

Track fastenings, f. o. b. Joliet, angle bars, 1.50c; railroad spikes, 1.75c to 1.80c, smaller size spikes, 1.70c base; track bolts with square nuts, 2.10c to 2.15c, base.

Plates.—Large premiums are being offered for prompt delivery of plates, but owing to the continuation of the crowded conditions of the mills, very few have been taken. Western producers are finding it impossible to make delivery earlier than the first of the year and the unfilled tonnage in plates will undoubtedly equal that in other lines. As they remain firm in their refusal to make contracts for 1913 requirements, western producers are a negligible factor in the market at present and quotations are largely nominal. Since it has been found that car requirements for moving the crops and handling the fall trade have been underestimated, there is no cessation in the activity of car building and builders' requirements will occupy the mills until well into the coming year. The San Antonio & Aransas Pass is in the market for 500 box cars and the Oregon Electric, of Portland, Ore., has placed its order for 25 coaches and six combination passenger and baggage cars with the American Car Co.

We quote, f. o. b. Chicago, as follows:

Tank plates, ¼ inch thick, 6⅝ to 100 inches wide, 1.53c. For extras, see Pittsburgh report.

Store prices are as follows:

Tank steel, ¼ inch and heavier, up to 72 inches wide, $1.90.

Sheets.—While there has been no further change in mill prices in this territory, store prices are much stronger and the demand upon jobbers is rapidly exhausting the supplies on hand. As mill delivery cannot be secured, it is certain that a considerable business in sheets will be carried over to the new year on account of stock shortages. Western mills are unable to book any new business and are not considering that offered for 1913.

We quote, f. o. b. Chicago, as follows:

Blue annealed, No. 10, 2.10c; No. 12, 2.15c. Box annealed, No. 28, 2.50c. Galvanized No. 28, 3.60c.

For mill prices, see Pitsburgh report. Freight to Chicago, 18 cents.

Wire Products.—While no further advance in wire quotations has materialized, the present demand would seem to justify it and its early arrival is confidently expected in many quarters. The leading interest is having but little difficulty in filling its books at present quotations, as on account of the large amount of low priced tonnage taken by some independents, there is very little competition in this territory. The fall trade is further advanced than is usual at this time of the year and jobbers are specifying heavily against their contracts for future requirements.

We quote, f. o. b. Chicago, as follows:

Wire nails, jobbers' carload lots, $1.83; retailers' carload lots, $1.88, retailers' less than carload lots, $1.93; painted barb wire, jobbers' carload lots, $1.88; retailers' carload lots, $1.93; retailers less than carload lots, $1.98, with 30c for galvanizing; plain wire, jobbers' carload lots, $1.63; retailers' carload lots, $1.68.

Merchant Pipe and Tubes.—While higher quotations on merchant pipe and tubes have been expected, there is no change in prices at present. Western makers continue to have difficulty in meeting the consumers' requirements and are weeks behind on delivery. While it was expected that producers would be able to catch up with the demand, it is evident that the fall trade had been underestimated, and that they will

be crowded to capacity for the rest of the year.

We quote, store prices on merchant pipe and tubes, as follows:

Iron and Steel Pipe Basing Prices.

	Steel Black.	Steel Galv.	Iron. Black.	Iron. Galv.
Butt.				
⅛ inch and ¼ inch.	69.2	48.2	62.2	41.2
⅜ inch	73.2	62.2	67.2	51.2
½ inch to 1½ inch.	76.2	67.2	70.2	58.2
Lap.				
2 inch	74.2	66.2	67.2	57.2
4½ inch to 6 inch..	75.2	66.2	58.2	59.2
Card Weight.				
7 inch to 12 inch...	72.2	61.2	66.2	55.2
Extra Strong Plain Ends.				
Butt.				
⅛, ¼, ⅜ inch.....	64.2	52.2	59.2	47.2
½ inch	69.2	57.2	64.2	52.2
2 inch to 3 inch....	74.2	62.2	....	....
Lap.				
2 inch	70.2	58.2	65.2	53.2
7 inch to 8 inch....	64.2	52.2	59.2	47.2
Double Extra Strong.				
Butt.				
½ inch	57.2	45.2	....	....
¾ inch to 1½ inch.	60.2	49.2	....	....
Lap.				
2 inch	58.2	46.2	....	....
4½ inch to 6 inch..	59.2	47.2	....	....
7 inch to 8 inch....	52.2	40.2	....	....

Tubes.

	Lap weld steel.	Charcoal iron.	Shelby seamless.
	Per cent.	Per cent.	Per cent.
1 inch	37	..	55½
1¼ to 2¼ inch.....	53	38	34
2½ to 3½ inch.....	63	48	44
3½ to 4½ inch.....	65½	48	44
5 to 6 inch.....	53	..	..

Cast Iron Pipe.—Due to the increasing strength of pig iron, cast iron pipe makers have advanced prices on an average of $2 a ton. Although it is often difficult to maintain an advance on this material, owing to the nature of the trade, no difficulty is expected at present, as consumers' requirements seem to be far in excess of their usual total at this time of the year. Routine inquiries continue good and a number of large tonnages are pending. The requirements of Kansas City for 3,000 tons of 36-inch water pipe mentioned last week will be closed this week.

We quote, f. o. b. Chicago, as follows:

Four-inch water pipe, $30, 6 to 12 inches, $28, larger sizes, $27; gas pipe, $1 a ton higher.

Old Material.—Dealers in this vicinity are making efforts to strengthen the market, as there is a strong feeling that the increases in the stocks held by consumers together with the certainty of large offerings by the railroads in the near future, will result in a considerable depression. There are a few changes in quotations, however, and the general tendency is as it has been, speculative dealing being at a minimum. The labor shortage which has prevailed throughout the summer has not been improved and in many cases consumers have been unable to spare men to move scrap, owing to the pronounced congestion in finished lines. Stocks in this territory are slightly increasing and in some cases are sufficient to run for several months. Railroad offerings during the week were small, the largest list being issued by the Chicago, Burlington & Quincy. This comprehends 2,000 tons, the principal items being 200 tons of No. 1 railroad wrought and a like amount of No. 2. The Chicago & Alton has asked for bids on 6,000 tons of miscellaneous scrap and the Grand Trunk has sent out a list of small tonnage.

We quote, for delivery in consumers' yards, Chicago, as follows:

Gross Tons

Old car wheels	$13.25 to 13.75
Old iron rails	16.50 to 17.00
Rerolling rails (5 ft. and over)	13.25 to 13.75
Old steel rails (3 ft. and under)	12.50 to 13.00
Frogs, switches and guards	11.75 to 12.25
Heavy melting steel	11.50 to 12.00
Shoveling steel	11.50 to 12.00

Net Tons

No. 1 R. R. wrought	$12.25 to 12.75
No. 2 R. R. wrought	11.25 to 11.75
Arch bars and transoms	15.75 to 16.00
Knuckles, couplers and springs	11.75 to 12.25
Shafting	15.00 to 15.50
Iron car axles	19.50 to 20.00
Steel car axles	15.50 to 16.00
Locomotive tires	13.50 to 14.00
Dealers forge	9.75 to 10.25
Pipe and flues	9.25 to 9.50
No. 1 cast	11.75 to 12.25
No. 1 busheling	10.00 to 10.50
No. 2 busheling	7.25 to 7.75
No. 1 boiler cut	8.25 to 8.75
Boiler punchings	12.50 to 13.50
Cast and mixed borings	6.50 to 6.75
Machine shop turnings	7.25 to 7.50
Railroad malleable	11.75 to 12.25
Agricultural malleable	10.50 to 11.00
Angle bars, splices, etc., iron	14.25 to 14.75
Angle bars, steel	11.25 to 11.75
Stove plate and light cast scrap	10.00 to 10.50

CLEVELAND

Sale of Basic on Long Term Contract

Office of THE IRON TRADE REVIEW,
Penton Bldg., Aug. 20.

Iron Ore.—Fogs during the last few days delayed the movement of vessels, but shipments continue heavy and it is expected that the total for August will be equal to that of July, making the third consecutive month to exceed 7,000,000 tons. Vessels are having all they can do to take care of their contracts. Sales of small lots of ore continue and belated buyers are experiencing some disappointment in not being able to get ores best adapted to their uses.

On base ores with the guarantee of 55 per cent on old range and Mesabi Bessemer, and 51½ per cent on old range and Mesabi non-Bessemer, we quote as follows: Old range Bessemer, $3.75; Mesabi Bessemer, $3.50; old range non-Bessemer, $3.00; Mesabi non-Bessemer, $2.85.

Pig Iron.—Prices continue strong with a tendency to advance, although not quotably higher in the Cleveland district. It is understood that a valley basic maker has closed a long-term contract calling for an aggregate tonnage of 50,000, with an open-hearth manufacturer, the iron taking a 90-cent freight rate. The price is a sliding scale arrangement based upon trade paper quotations.

We quote:

No. 1 foundry	$14.25 to $14.75
No. 2 foundry	13.75 to 14.25
No. 2 southern	15.85 to 16.35
Bessemer	15.15 to 15.30
Lake Superior Charcoal	16.25 to 16.50
Jackson co. 8 per cent silvery	18.05

Coke.—The expected car shortage is beginning to be felt and although not yet serious, there is fear that within a few weeks considerable difficulty will be experienced in delivering coke. Quotations on furnace coke adhere very closely to $2.25. There is limited buying of foundry coke. We quote, as follows, at the ovens:

Connellsville furnace coke, $2.25 to $2.30 for prompt delivery, and $2.25 to $2.35 on contract; Connellsville foundry coke, $2.60 to $2.75 for prompt, and $2.50 to $2.75 on contract.

Finished Material.—Pressure for delivery of finished material continues very strong and some very high prices are being paid for prompt delivery. Eastern Pennsylvania mills have advanced their quotations to

1.45c, mill, on universal plates and 1.40c on sheared for western shipment, equivalent to 1.54c and 1.49c, respectively, Pittsburgh. Angles have been shipped from an eastern mill and sold as high as 1.60c, delivered, in Ohio territory. There is a tremendous demand for reinforcing bars and a leading re-rolling company in northwestern Pennsylvania has advanced its quotations to 1.30c, mill, in carload lots, and 1.35c, mill, in less than carload lots. It will not guarantee deliveries in less than six weeks.

Cleveland jobbers have advanced quotations on shapes, plates, bars and sheets $2 per ton and are now quoting as follows:

Plates and shapes, 2.05c; bars, 1.85c; No. 10 blue annealed sheets, 2.30c; No. 28 black, 2.65c; No. 28 galvanized, 3.70c. The demand for bar iron is active. Mills are well supplied with orders and have difficulty in getting enough labor to run double turn.

The Lackawanna Bridge Co., Buffalo, N. Y., has taken 2,000 tons for the Lima Locomotive Corporation, Lima, O. The Worden-Allen Co., Milwaukee, has the general contract. The Dodge Mfg. Co., Detroit, is taking bids on a new foundry, requiring between 400 and 500 tons. The Whitehead & Kales Iron Works, Detroit, has taken 300 tons for a building for the Cadillac Motor Car Co., Detroit. Small sized standard structural shapes, such as beams and channels, are scarce and are being obtained from companies which ordinarily do not handle that business, and at practically their own figures. There is no scarcity of plates.

Old Material.—Steel making scrap continues active, a sale of 4,000 tons having been made to a local consumer this week at a figure around $13. The same buyer is in the market for more heavy steel while another large buyer is expected to return to the city shortly and enter the market. Outside inquiries continue in good volume. The new minimum of $13 marks an advance of $1 over sales made earlier in the year. Rolling mills are offering $11.25 for No. 1 busheling for later shipments, a concession by the buyers who have been offering prices obtainable before the advances in finished products. Heavier purchases would be made, but the mills are hampered by labor scarcity. There is renewed interest in relaying rails which have advanced to a $20 minimum. The N. & W. railroad list brought good prices. The Nickel Plate list closes Aug. 23. We quote, f. o. b. Cleveland, as follows:

Gross Tons.

Old iron rails	$15.50 to 16.00
Old steel rails (under 6 ft.)	14.00 to 14.50
Old steel rails (over 6 ft.)	14.00 to 14.50
Relaying rails	20.00 to 20.50
Old car wheels	13.00 to 13.50
Old steel boiler plate	11.25 to 11.50
Malleable iron (railroad)	13.25 to 13.50
Steel axles	19.00 to 19.50
Axle turnings	10.50 to 11.00
Malleable iron (agricultural)	11.50 to 12.00
Heavy steel	13.00 to 13.25
Country mixed steel	11.25 to 11.75
Bundled sheet scrap	10.00 to 10.50

Net Tons.

No. 1 R. R. wrought	$12.50 to 13.00
No. 1 busheling	11.00 to 11.50
No. 1 machine cast	11.50 to 12.00
No. 1 dealers' wrought	11.00 to 11.50
Machine shop turnings	8.25 to 8.50
Pipes and flues	9.75 to 10.25
Wrought drillings	8.25 to 8.50
Cast borings	7.00 to 7.25
Stove plate	9.50 to 10.00
Wrought iron piling plate	14.50 to 15.00
Wrought iron arch bars	14.00 to 14.50

CINCINNATI

Low Prices Disappearing—Offers for 25,000 Tons

Office of THE IRON TRADE REVIEW,
503 Mercantile Library Bldg., Aug. 20.

Pig Iron.—The market continues to grow in strength, and has been characterized during the past few days by the gradual disappearance to a certain extent of the extreme low prices on both southern and southern Ohio grades. After a long time practically all of the dealers have ceased to sell southern No. 2 foundry iron at $11.50, Birmingham basis, and the lowest quotation now being given the buyers is $11.75, while by far the majority are holding firm at $12 for either spot shipment or delivery during the rest of the year. Some of the large furnace interests are also beginning to offer iron for the first quarter of 1913, although only a few will take business as far ahead as through the whole first half. The general price for this delivery is $12.50, Birmingham, but some are holding firm at $13.

The southern Ohio situation is on as strong, if not stronger, basis than the southern. While it is possible to secure a little iron now and then at prices slightly lower than $14, Ironton, there is very little foundry iron being sold below this figure. A few furnaces also state that they will sell for the first quarter of 1913 at $14.50, but the majority will not accept any contracts for this delivery, and some are entirely out of the market, and have lately repeatedly refused to bid on some rather attractive inquiries. Malleable iron is also scarce, and cannot always be had for the deliveries and amounts wanted.

Actual buying and selling in this immediate territory have decreased during the past week in comparison with the week previous, but the aggregate of sales of most dealers, while mostly for small lots, will total a fair tonnage. There is a good inquiry in the market, but a large part of it will probably be placed in other cities on account of the locations of the melters from which they come.

A large southern manufacturer is quietly making offers for about 25,000 tons of southern grades, but is finding it a hard matter to get such a large amount at the present prices. An Indiana melter is in the market for 1,000 tons of No. 2 southern soft, and 500 tons of silvery for the first half of next year. A northern Ohio user wants 2,000 tons of northern and southern grades, and a manufacturer from the same part of the state is inquiring for 1,250 of malleable iron for delivery to extend through this year and the first half of next year. With freight rates $3.25 from Birmingham, and $1.20 from Ironton, we quote Cincinnati prices as follows:

Southern foundry No. 2	$15.00 to 15.25
Southern foundry No. 3	14.50 to 14.75
Southern foundry No. 4	14.25 to 14.50
Southern gray forge	14.00 to 14.25
Mottled	13.50 to 14.00
Southern No. 1 soft	15.50 to 16.00
Southern No. 2 soft	15.00 to 15.25
Standard southern car wheel	25.50 to 25.75
Northern No. 2 foundry	15.20 to 15.70
Northern No. 3 foundry	14.70 to 15.20
Northern No. 4 foundry	14.45 to 14.70
Jackson co. 8 per cent silicon	17.20 to 17.45

Coke.—A lot of 15,000 tons of Wise county coke has been recently sold

in this territory for southern shipment, and a much larger tonnage is expected to be contracted for within the next few days. Dealers are daily expecting that some of the furnaces in both the southern and Hanging Rock districts will close for their inquiries which have been in the market for some time, and which total about 90,000 tons. There is not much of a demand for foundry coke, despite the fact that the foundry business in and around Cincinnati has slightly improved recently. Connellsville furnace coke is still holding at from $2.25 to $2.50 for spot and contract shipment, and the best grades of Wise county coke are quoted at the same figures. Pocahontas coke for prompt shipment is given at from $2 to $2.25, and from $2 to $2.50 for contract. New River furnace coke is being offered at from $2.15 to $2.25. In practically all districts furnace coke is being held at from $2.50 to $2.75. We quote from the leading coke producing districts as follows:

	Prompt shipment.	Contract, second half.
Connellsville district:		
Foundry coke	$2.50 to 2.75	$2.50 to 2.75
Furnace coke	2.25 to 2.35	2.25 to 2.50
Wise county district:		
Foundry coke	$2.50 to 2.75	$2.50 to 2.75
Furnace coke	2.25 to 2.35	2.25 to 2.50 *Sliding scale basis.
Pocahontas district:		
Foundry coke	$2.25 to 2.50	$2.25 to 2.50
Furnace coke	2.00 to 2.25	2.00 to 2.50
New river:		
Foundry coke	$2.50 to 3.00	$3.00 to 3.25
Furnace coke	2.15 to 2.25	2.25 to 2.50

*Sliding scale basis means $1.60 for coke based on $9, Birmingham, for pig iron, with an advance of 16 2-3 per cent of the amount over $9 which pig iron is quoted. This is the usual basis. Other forms of sliding contracts are also made.

Finished Material. — The market is exceedingly strong, and several local offices of large eastern manufacturers state that they are out of the market on plates and shapes. One large company also states that it is out of the market on bars. Steel bars are quoted at 1.30c, and structurals at 1.35c, Pittsburgh, and it is generally rumored that an advance can be expected at any time. The local sheet situation continues to gain in strength, and the local mill is now from 30 to 40 days behind on orders. Prices are firm as follows: Black sheets, No. 28 gage, 2.05c, blue annealed No. 10, 1.30c, and galvanized sheets, No. 28, 3.15c. Bids for the new Y. M. C. A. building at Hamilton, O., will be in about Aug. 31, as the plans are about completed. It will be 12 stories, with a steel framework. For mill prices, see Pittsburgh report.

Warehouse business is good, and prices have been advanced on most of the articles carried in stock during the past few days. Steel bars, iron bars, structurals, plates, sheets and shafting are now being held at from 10 cents to 20 cents higher per 100 pounds for Cincinnati delivery, and twisted concrete bars are also selling at better prices than last week. Stocks in warehouses are gradually getting lower, and cannot be replaced as fast as the demand takes them away. Some dealers are not soliciting business to any extent, as that which comes in voluntarily is sufficient in proportion to the stocks on hand. A large central Ohio car builder is in the market for about 1,200 tons of rivets, to be used in building a large order of freight cars recently received. We quote warehouse prices f. o. b. Cincinnati, as follows:

Steel bars, 1.85c base; iron bars, 1.80c base; structurals, 2.05c base; plates, ¼ inch and over, 2.05c base; sheets, blue annealed No. 10, 2.20c base; rivets, cone head, 2.30c base; cold rolled shafting, 58 per cent discount; boiler tubes as follows: 1¾ to 2¼ inch, 60 per cent discount; 2½ inch, 62 per cent discount; 2¾ to 3¼ inch, 65 per cent discount; 3½ to 4½ inch, 67 per cent discount, and 5 to 6 inch, 60 per cent discount; soft steel cold twisted concrete bars, cut to length as follows: ¾ inch square and larger, 2.00c; ⅝ inch square and larger, 2.10c; ½ inch square and larger, 2.20c; 5-16 to ⅜ inch square and larger, 2.40c; ¼ inch square and larger, 2.55c.

Old Material. — There is a better feeling in the scrap iron market, and prices on several items have been advanced 25 cents a ton. Dealers are receiving more encouraging inquiries, and also better replies to letters sent out to customers. The fact that some of the foundries in this territory are also beginning to do a better business, adds strength to the market. No. 1 machinery cast is bringing 25 cents per net ton more than last week, and No. 1 busheling is also quoted a little higher. A recent sale of stove plate was made by a local dealer at $8.25, and another dealer bought a small tonnage of mixed cast at $8.75. We quote below prices dealers will pay, and also dealers' selling prices in Cincinnati and vicinity, as follows:

Gross Tons

Old iron rails	$12.25 to 13.00
Old steel rerolling	10.75 to 11.25
Old iron axles	17.25 to 17.75
Heavy melting scrap	9.75 to 10.25
Relaying rails	19.75 to 20.75
Bundled sheet scrap	7.50 to 8.00

Net Tons.

Old No. 1 R. R. wrought	$10.00 to 10.50
No. 1 machinery cast	10.25 to 10.75
No. 1 busheling	8.00 to 8.75
Stove plate	7.75 to 8.25
Machine shop turnings	6.25 to 6.75
Cast borings	6.00 to 6.50
Heavy turnings	6.75 to 7.25
Mixed cast	8.75 to 9.25
Malleable	7.00 to 7.50

BUFFALO

Heavy Sales of Pig—Prices Advance

Office of THE IRON TRADE REVIEW,
Buffalo, Aug. 20.

Pig Iron. — Greater strength was shown in the pig iron market for the past week than in the previous week. The tonnage placed was nearly as large as that of the week before, and prices displayed a stronger front than has appeared in this market in a long time. The estimated placement for the week of all grades of iron was upwards of 75,000 tons, and the inquiry remaining unclosed aggregated from 35,000 to 50,000 tons. Prices have been sharply advanced and some of the largest producers in this district have about reached the point where they must decline to quote on further tonnage for shipment over this year on account of the sold-up condition. It seems positively certain that spot shipments in the Buffalo district will be commanding a premium from this time forth, for the blast furnaces are being pressed to the extreme limit to keep up with the heavy requisitions being sent in by pig iron consumers.

The developments of the first half of August here resemble the demands of five and six years ago made upon the furnaces by the consumers, except that prices have not yet reached the high level that operated at that time. The sharp rise in prices for shipments over the rest of the year and first quarter of 1913, is indicated by the following schedule, f. o. b. Buffalo:

No. 1X foundry	$15.25 to 15.50
No. 2X foundry	15.00 to 15.25
No. 2 plain	15.00
No. 3 foundry	14.75 to 15.00
Gray forge	14.75
Malleable	15.25 to 15.50
Basic	15.00 to 15.50
Charcoal	16.50 to 18.00

Finished Material.—The pressure of consumers upon the mills for material is so much greater than the capacity of the producers that deliveries are being still further extended. A number of the interests and agencies represented here are practically sold up for the remainder of the year. There are but a few instances where the books of the mills have been opened for tonnage to be delivered in 1913, and some of the interests are declining to consider the premiums being offered for prompt deliveries, on the stand that it works an injustice to customers under contract with specifications in. One interest advanced steel bars to 1.40c base. Shapes and plates have stiffened to 1.40c base by most makers and agencies. Certain

types of reinforcing mesh have advanced $2 per ton. A week ago, warehouse prices were advanced $1; this week, $2 more was added and the prevailing premium on prompt deliveries is from $5 a ton and up.

The Lackawanna Bridge Co., Buffalo secured the contract for the New York Central's boiler shop at Avis, Pa., requiring about 500 tons; bids will be opened next week on the addition to the Shredded Wheat Co.'s plant at Niagara Falls, N. Y., requiring about 1,000 tons; the Metz Bros. Co., Buffalo, is low bidder on the Curtiss building, Buffalo, taking about 600 tons.

Old Material. — The market is stronger. In some commodities, particularly heavy melting steel, railroad wrought, car wheels, old iron and steel axles, low phosphorus scrap, railroad malleable and machine cast scrap, the prices have stiffened over the range prevailing for several weeks back. The demand shows signs of improvement and inquiries continue to be more numerous. Consumers continue to negotiate for lower schedules, but the dealers are becoming more firm in holding to their prices. One factor in this market seems to be the difficulty of the yards to get labor to handle the material. The following schedule, per gross ton, f. o. b. Buffalo, represents the market:

Heavy melting steel	$13.00 to 13.50
No. 1 railroad wrought scrap	13.50 to 14.25
No. 1 R. R. and mch. cast scr'p	13.25 to 14.00
Old steel axles	15.25 to 16.25
Iron axles	22.00 to 22.50
Car wheels	13.25 to 13.75
Railroad malleable, scrap	11.75 to 12.25
Wr'ght iron and soft steel turn.	8.25 to 8.75
Cast iron borings	7.50 to 8.00
Low phosphorus steel scrap	15.75 to 16.50
Old iron rails	15.00 to 15.50
Tank iron	10.00 to 10.25
Boiler plate, sheared	13.75 to 14.25
Pipe and tank	9.50 to 10.00
Stove plate	11.00 to 11.50
Sheet iron	7.00 to 7.50
Locomotive grate bars	11.00 to 11.25

PHILADELPHIA

Market Active and Prices Still Advance

Office of THE IRON TRADE REVIEW,
Philadelphia, Aug. 20.

Prices in practically all lines are showing a steady advance in the eastern market and as the offering of new business is liberal, conditions manifest present strength and bright future prospects. Eastern makers in the week generally put up official schedules on structural shapes to 1.40c, Pittsburgh minimum, and one leading Pittsburgh independent mill has done likewise. In shapes as well as plates, premiums of $4 to $5 a ton continue to be held. Bookings in blue-annealed sheets are heavy in the east and the 1.50c, Pittsburgh price, seems short-lived. Generally the mills are entering more new tonnage than they are shipping. The American Bridge Co. has been a buyer of billets in the open market for its local plant. Pig iron inquiry is active, but makers are cautious in quoting into next year. A round block of basic for first quarter has been sold at $16.15, delivered, a 40 cents advance and another at $16.25. Makers of basic are now quoting formally at $16.50, delivered, on pending business for first quarter. The next sale promises to be around this level. A lot of 3,000 tons of special analysis basic for this year's shipment has been done at better than $16, delivered. Old material is strong and the dealers are holding for higher prices, which are confidently expected.

Pig Iron.—Uncertainties over ore and fuel costs after Jan. 1 are leading eastern furnace men to adopt cautious selling policies for first quarter and first half deliveries, and this condition is preventing these makers from taking full advantage of the liberal inquiry that is coming out. While there are some notable exceptions, the attention of buyers is becoming more and more riveted on their requirements after the turn of the year. The inquiry of this sort is largely for steelmaking iron, as eastern Pennsylvania foundry grades have not yet responded in a conspicuous way to the market's improvement, though the outlook for them is better, and in price they are showing greater strength in sympathy with other irons. Where makers are willing to discount the future and name fair advances, they have booked freely. In basic, the first quarter market has been defined by the purchase of blocks of 10,000 tons each from two eastern makers by a leading eastern Pennsylvania plate mill, one lot at $16.15, delivered, and another at $16.25. The recent total purchases of basic by this consumer for fourth and first quarter aggregate about 35,000 tons and it is still out for about 20,000 tons additional for first quarter. Other eastern basic consumers are sounding out the first quarter market. Low phosphorus iron is more active, showing the heavier operations of the steel casting plants. One eastern consumer has taken 1,500 tons additional of this grade from an eastern Pennsylvania maker and has also recently purchased about 3,000 tons from the Lebanon district. A Philadelphia buyer is out for 3,000 tons of low phosphorus for this year and first quarter. A local malleable buyer has closed for about 2,000 tons for first half around $16.70, delivered. Sales in the week of about 4,000 tons of charcoal iron for shipment into next year were also made. Lake Superior charcoal iron is now up 50 cents to $16, Buffalo. The Pennsylvania railroad has put out its largest inquiry in several years, calling for a maximum of 10,800 tons for last quarter, delivery to Altoona. This is divided into 4,200 tons of No. 3, 4,200 tons of No. 2X, 1,200 tons of northern, and 1,200 tons of southern charcoal. A pipe maker is out for 2,000 tons of forge and No. 3 for this year. Minimum prices of No. 2X, Philadelphia, are close to $16, delivered. There has been some selling around $15.85, delivered, by central Pennsylvania makers, but these prices are passing. In eastern Pennsylvania, $15.25 to $15.50, furnace, is quoted. With the exception of the largest maker, Virginia furnaces have been selling rather freely at $14, furnace, for No. 2X for this year, one interest having booked 5,000 to 6,000 tons at this level. The leading Virginia maker is also elevating its schedule this week to $14, furnace. The withdrawal of the water competitive rate of $2.80 from Virginia to Philadelphia by the C. & O. and B. & O. railroads under an announcement just made, places the rail rate flatly at $3, or 20 cents higher than heretofore.

We quote for prompt and last quarter shipment to consumers' plants in Philadelphia and vicinity, as follows:

Eastern Pa. No. 1X foundry	$16.25 to 16.50
Eastern Pa. No. 2X foundry	15.85 to 16.00
Eastern Pa. No. 2 plain	15.50 to 15.75
Standard gray forge	15.25 to 15.50
Basic (Eastern and Central Pa.)	15.75 to 16.00
Virginia No. 2X	16.75 to 17.00

Southern No. 2	16.00 to 16.50
Standard low phosphorus	20.50 to 21.00
Malleable	16.25 to 16.50

(First Quarter.)

Basic (Eastern and Central Pa.)	$16.15
Malleable	16.70

Finished Material. — Remarkably high prices being paid for quick shipments and the maintenance of active new business, which is increasing rather than reducing mill bookings, are still the striking characteristics of the eastern finished steel market. The Phoenix Iron Works, the Eastern Steel Co. and the Bethlehem Steel Co. are now quoting standard structural shapes at a minimum of 1.40c, Pittsburgh, or 1.56c, Philadelphia, and are getting some round advances over this level. On stock orders from the mills 1.60c, mill, is being freely paid, and up to 1.75c, mill, has been done. For shapes from jobbers, 2.00c, Philadelphia, has been paid. In plates, several sales at $4 premium over 1.40c, Pittsburgh, for universals, the eastern price, were obtained this week. Prompt steel bars have brought round premiums to eastern mills. No trouble whatever has been encountered by the leading eastern sheet maker in getting orders at 1.50c, Pittsburgh, the new price for blue annealed; in fact, the tonnage has been so large that this price is now being quoted sparingly and $1 to $2 advances have been received on some lots. Announcement is made that a leading Pittsburgh independent has advanced plates and shapes to 1.40c, Pittsburgh, leaving bars unchanged at 1.30c, Pittsburgh.

It may be truthfully said that eastern mills are geting all the business they can handle with their well-filled order books. Some plants have accumulated full bookings for more than a month ahead, which is especially satisfactory because of the policies usually followed in the east to accept few requirement contracts covering forward periods. Generally makers are winding up a month with more tonnage than they began it.

An unusual incident of the market is the purchase of about 1,500 tons of 4 x 4-inch rolling billets from an eastern independent by the Pencoyd Works, Philadelphia, of the American Bridge Co. This works is short on these sizes of steel.

A new inquiry for Scotland for 3,000 tons of narrow steel skelp has appeared. Eastern makers have lately been quoting 1.50c, mill, on plates for export, but because of the active market, are indifferent whether they get these orders or not. The Guerber Engineering Co. has taken 300 tons for the Hanover school at Wilkes-Barre and 300 tons for an abattoir at Allentown. J. E. & A. L. Pinnock, Philadelphia, have the general contract for the Muskogee, Okla., post office, about 200 tons, for which Bethlehem sections are specified.

We quote delivered at consumers' plants, in Philadelphia and vicinity, as follows:

Plain structural shapes, 1.50c to 1.60c; tank plates, 1.50c to 1.60c; steel bars, 1.45c; common bar iron, 1.32½c to 1.35c; cut nails, 1.80c to 1.85c; blue annealed sheets, No. 10 gage, 1.65c to 1.70c; 4 x 4-inch open-hearth rolling billets, $24.40; forging billets, $29.40 to $30.40. Extras shown under Pitsburgh report. Philadelphia warehouse prices 1.85c to 1.95c for plates, shapes and bars.

Old Material.—Practically all the leading buyers of heavy steel in the eastern district are in the market in one form or another, but they are not offering over $14, delivered, and there is little tonnage now available at this price. Some dealers are holding for $14.50, delivered. The present market in steel is largely nominal. The iron mills have been buying more freely. In No. 1 railroad wrought $16.50, delivered, was recently paid for railroad offerings and $16.25, delivered, has been done in the open market. Low phosphorus scrap is showing some demand. Cast materials are slow. The market in general is strong and active buying would probably send up prices considerably. We quote, gross tons, delivered to consumers' plants in eastern Pennsylvania and western New Jersey, as follows:

Old iron rails	$16.50 to 17.00
Old steel rails (rerolling)	15.25 to 15.50
No. 1 heavy melting steel	14.00 to 14.25
Old car wheels	14.25 to 14.50
Old iron axles	24.00 to 25.00
Old steel axles	17.50 to 18.00
No. 1 railroad wrought	16.00 to 16.50
Wrought pipe	12.75 to 13.25
Cast borings	9.75 to 10.25
Machine shop turnings	10.75 to 11.25
Heavy cast	13.50 to 14.00
Malleable	11.75 to 12.25
Stove plate	10.75 to 11.25
No. 1 forge	12.75 to 13.25

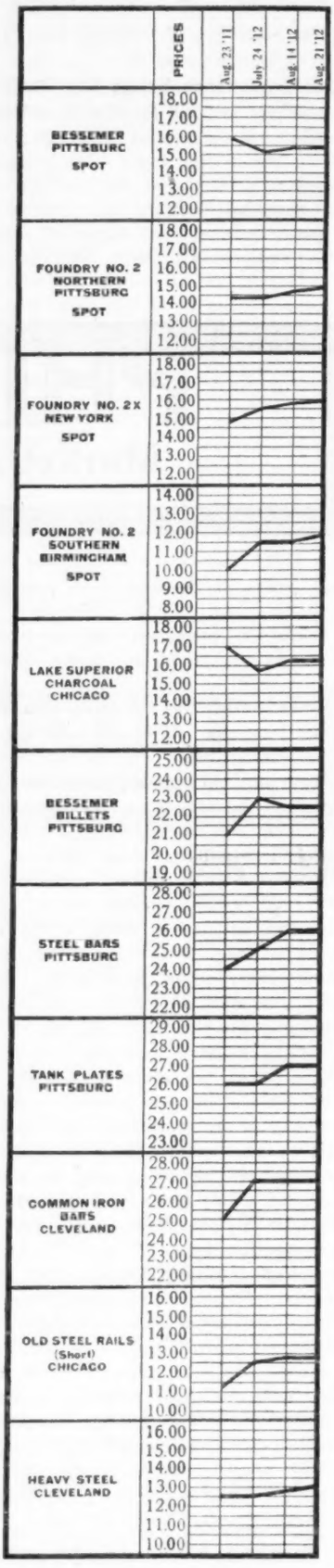
Freight rates per ton on scrap from Philadelphia to principal eastern consuming points are: $0.60 to Ivy Rock, Pa.; $0.65 to Phoenixville, Pa.; $0.80 to Coatesville, Pa.; $0.85 to Bethlehem, Pa., Reading, Pa., and Roebling, N. J.; $1.10 to Pottsville, Pa., Lebanon, Pa., and Columbia, Pa.; $1.20 to Harrisburg and Steelton, Pa.; $1.40 to Milton, Pa.

Selects Site for Station

Chicago, Aug. 20.—Announcement has been made by the Pennsylvania Railroad Co. of the location of the proposed union passenger station in this city. It will be on the block bounded by Adams, Canal and Clinton streets and Jackson boulevard. The total cost is estimated at $35,000,000 and it is expected that 30,000 tons of structural shapes, bars and miscellaneous steel will be required.

The Jones Machinery & Foundry Co., Chattanooga, Tenn., has made arrangements to enlarge its cupola.

PRICE CHART



NEW YORK

Every Indication of Sound Conditions

Office of THE IRON TRADE REVIEW,
115 West Street Bldg., Aug. 20.

Iron Ore.—Eastern ore sellers, both foreign and domestic, are meeting with caution any efforts of the furnaces to sound out next year's prices and though there have been no definite developments, it is indicated from present conditions that sharp advances will be asked. Sellers of some foreign ores who took business for this year at 7¼ cent per unit of iron, Philadelphia, express their views for next year at not less than 8 cents per unit. The operating furnaces in the east have plenty of ore under contract to cover their requirements for this year; in fact, some of them are still carrying some quantities of Superior ores on Lake Erie docks, which they have not been able to draw upon for the past year or more.

Pig Iron.—A heavy volume of bookings, with an inquiry that is equally large and well distributed over different delivery periods and grades, is putting makers in a more bullish frame of mind and the market has every appearance of soundness and vigorous strength. Some sellers report they are enjoying the most liberal bookings in the past five years. Total sales in metropolitan and surrounding districts during the past week have reached about 25,000 tons and about as much inquiry is pending. Buffalo has continued to sell freely to New York state and New England points and heavy orders have continued there the past week, causing some leading makers there to advance prices to $15 for furnace No. 2X, for this year or first quarter. Virginia iron has also been moving very freely to this district and to New England and the leading maker of that territory which has been selling at $13.75 furnace for No. 2X is advancing this week to a minimum of $14 furnace, at which other Virginia makers have been entering considerable business for this year. Some prompt lots of Virginia have been done at $14.25 furnace. Eastern Pennsylvania makers are still cautious in quoting after Jan. 1, because of uncertainties over raw material costs, but the market for this year is strong and rules about $16 to $16.25, tidewater, for No. 2X. Sales of the week have included 6,000 tons of basic to a consumer nearby this district, on an equivalent basis of $16.15, eastern Pennsylvania delivery; 3,000 tons of Virginia metal to a New England buyer; 2,000 tons for this year at $13.75 furnace, and 1,000 for first quarter at $14.25 furnace; several thousand tons to a New England textile machinery builder; 1,000 tons of Pennsylvania No. 2X to a Jersey buyer for this year; numerous lots of Virginia iron aggregating 5,000 to 7,000 tons and other lots. In inquiries, the General Electric Co. has put out different inquiries for foundry, low phosphorus and special analysis iron for deliveries running through first quarter, aggregating about 14,000 tons. Several New Jersey buyers are in the market, one for 1,000 to 2,000 tons of No. 2X, for first quarter, another for 1,000 tons of No. 2X, for shipment through January, and a variety of smaller tonnages. An interesting export inquiry to appear calls for 2,000 tons of basic for shipment this year to Japan. The disturbed political conditions in China, the regular source of supply, are interfering with the deliveries of metal to this consumer. Malleable has been sold at eastern points at a shade below $17 delivered, or $14.50 furnace. Lake Superior charcoal was advanced 50 cents in the week for this year's shipment to a basis of $16, Buffalo. The No. 2 Crane and one of the Hellertown furnaces resumed this week. The new Port Henry furnace will blow in about Oct. 1. A second Hellertown furnace may soon resume.

We quote for prompt and last quarter shipment at New York tidewater as follows:

Northern foundry No. 1	$16.25 to 16.50
No. 2X foundry	16.00 to 16.25
No. 2 plain	15.50 to 16.00
No. 2 Virginia	16.75 to 17.00
No. 2 southern foundry	16.00 to 16.50
Malleable	16.25 to 16.50
Gray forge	15.25 to 15.50

Ferro-Alloys.—Prompt ferro-manganese continues scarce and is commanding premium prices. Carload lots for prompt delivery have brought $53 and some small sales for September have been done at $55, seaboard. Light tonnages for delivery after the first of the year have been closed at the regular forward price of $51, seaboard. Some inquiry for this year remains unclosed in the market, consumers having difficulty to get material. An inquiry for 1,000 tons for last half of next year has appeared. The market in 50 per cent ferro-silicon is strong and makers are well sold up on outputs. We quote standard English 80 per cent ferro-manganese at $53 to $55, seaboard, for early shipment and at $21, seaboard, for forward and 50 per cent ferro-silicon at from $70 to $72.50, Pittsburgh.

Cast Iron Pipe.—There is active buying of sizes under 12 inches, but above that the eastern market shows only a moderate tonnage. Public lettings in the east are still few. The United States Cast Iron Pipe & Foundry Co. took 400 tons for Taunton, Mass., at $23.40, delivered, and also 700 tons for Lowell, Mass. Medford, Mass., has placed 150 tons. Prices continue to show increased strength. We quote 6-inch pipe at from $22 to $23, f. o. b. New York, in carload lots.

Finished Material.—Advancing prices in tonnage lines continue to manifest the strength of the finished market and the overflowing condition of the mills which are unable to make deliveries even at the higher levels under four weeks in the east and in some cases under eight weeks. The comparatively small portion of early rollings they have free is being sold without trouble by eastern mills at premiums of $3 to $5 and even more. Effective within the week, eastern shape mills advanced their minimum to 1.40c, Pittsburgh, or 1.56c, New York. These makers are asking this price of the larger buyers such as the car builders, who now have considerable tonnage in the market. Eastern plate mills are up to 1.40c, Pittsburgh, officially, and one leading plant, effective yesterday, is quoting 1.45c, Pittsburgh, or 1.61c, New York, on universal plates. Steel bars remain nominally at 1.30c, Pittsburgh. Bar iron continues to gather strength. The offering of new business is very generous considering the way buyers are obliged to wait for deliveries on sizable lots.

Recent structural lettings in the eastern district have been more nu-

merous and including the official announcement made of several contracts which had been previously conceded to the leading interest, have aggregated from 40,000 to 50,000 tons. On these lettings, the fabricating shops are getting prices $10 a ton and more over those quoted during the first quarter of the year.

The American Bridge Co. officially announces it will furnish 14,000 tons for the Biltmore hotel and about 10,000 tons representing the full requirement of the new Western Union Telegraph Co. building, both this city; 5,500 tons for the fourth addition to the building of the Curtis Publishing Co., and 3,500 tons for the Hotel Adelphia, formerly known as the Fairmount, both of Philadelphia. The leading interest will also furnish about 2,500 tons for the 50 Broad Street building, this city, for which Post & McCord have the erection contract; 1,900 tons for bridges for the Boston & Maine at Lynn, Mass. Other awards include 1,600 tons to the Boston Bridge Works for the Merchants' National Bank building, Boston; 550 tons to the Burlington Construction Co. for Fisk Rubber Co. buildings, Chicopee Falls, Mass.; 650 tons for a Lehigh Valley railroad bridge at Glen Onoko, Pa., to the Phoenix Bridge Co.; 400 tons to the Chesapeake Iron Works for the Citizens' National Bank building, Raleigh, N. C.; 400 tons for bridges for the Georgia Coast & Piedmont, and 350 tons for bridges for the Atlantic Coast Line, both the Virginia Bridge & Iron Works; 300 tons to the Belmont Iron Works for Gurney Electric Co. buildings, at Homedale, Pa.; 200 tons to the Eastern Structural Steel Co. for addition to the State Mutual Life Insurance building at Worcester, Mass.; and 200 tons of bridge work for the New Haven at Westerley, R. I., to the Boston Bridge Works. The New York Central railroad has recently distributed orders for various contracts aggregating about 3,500 tons and including 1,500 tons for a bridge at Stockport, N. Y., and 500 tons at Utica, both to the Phoenix Bridge Co., 300 tons for signal bridges to L. & F. Shoemaker & Co., 500 tons of terminal area work and 250 tons for a sub-station, and 300 tons of highway bridges to independent shops.

This road is now in the market for some tonnage for terminal area work, this city, and for bridge improvements.

The taking of bids on the large inquiry for structural material of the Brooklyn Rapid Transit Co. for 91,000 tons with an option on 50,000 tons additional, which was to have been closed last week, has been deferred until the present week. Owing to the fact that the prospective buyer has not yet closed operating contracts for subway and elevated railroad extensions, with the city, it is not believed that an award will be shortly forthcoming. Another section of the Lexington avenue subway is now up for bids and three others are ready for advertising. The steel requirements for these sections have not yet been announced, but will reach 10,000 tons or more.

The Phoenix Iron Works officially announces that it will no longer roll small angles under 2½ x 2½ and 2 x 3 inches, but will confine its attention to the larger sizes.

We quote, delivered at New York tidewater, as follows:

Plain structural shapes, 1.56c to 1.61c; tank plates, 1.65c to 1.61c; steel bars, 1.46c; common iron bars, 1.35c to 1.40c; steel bars from store, New York delivery, 1.90c; plates and shapes from store, 2.05c; extras as shown under Pittsburgh report.

BIRMINGHAM

Small Tonnage for Next Year Sold at $12.50

Office of THE IRON TRADE REVIEW,
Birmingham, Ala., Aug. 20.

Pig Iron.—An aggregate of 15,000 to 18,000 tons of foundry grades, for delivery prior to Jan. 1 next, was booked in the past week at a basis of $12 at Birmingham. In this tonnage, a round lot is for export to Italy, against which shipment is now being made. A lot of 500 tons of No. 2 foundry, for delivery in the first quarter of next year, was entered in the week at $12.50 per ton at Birmingham, which is the only engagement for such delivery that has been reported. With the exception of the tonnage sold for export, the recent demand has covered all quarters of the trade very generally, especially the northern sections. The majority of transactions involved lots of 500 to 750 tons each for shipment within the next 60 to 90 days, although a decided improvement in the demand for carloads for spot shipment was noted. In this last, the demand for low grades has predominated, and owing to the inability to furnish the percentage of Nos. 3 and 4 foundry and analysis iron involved, has increased. On the small requirements submitted, practically all of the producing interests quote the low grades at a differential of 25 cents per ton, while no effort is being made to enter larger requirements for advanced delivery. As to deliveries in next year, all quotations are submitted with more or less reluctance. In certain cases, a basis of $13 at Birmingham, would no doubt be adhered to for first quarter deliveries, but as shown above, some tonnage has been sold for that delivery at $12.50. The volume of inquiry now before the trade for comparatively early deliveries is larger than at any time for some two months past, and consists of lots of 100 to 1,000 tons each. An aggregate of 3,000 tons for the first quarter is also pending.

With the recent heavy forwarding for export, the movement from yards for the month is well ahead of the production for that time, and further inroads are to be made in the stock accumulation by the tonnage to be exported before Sept. 1. It is noted that practically all of the tonnage sold for export has involved those grades actually on hand, while the daily production has been taken care of by the shipments made into regular territory. From all indications, the total reduction effected in stock during this month will be larger than that of July. As order books are not considered formally opened for deliveries after Jan. 1, a schedule of prices for such delivery is not quoted, but an advance of 50 cents to $1 per ton over the figures below, which are firm for the remainder of the year, would apply to the first quarter. For the remainder of the year, the several grades are quoted as follows, per gross ton, f. o. b. cars at Birmingham district furnaces, viz.:

For delivery during the remainder of the year:

No. 1 foundry	$12.50
No. 2 foundry	$11.50 to 12.00
No. 3 foundry	11.00 to 11.50
No. 4 foundry	10.50 to 11.00
Gray forge	10.25 to 10.75
Mottled	10.00 to 10.25
Standard basic	10.75 to 11.25
Off basic	10.50 to 10.75
Standard charcoal	22.50 to 23.00

With the exception of charcoal iron, an advance of 25c to 50c per ton would be asked over the above figures for deliveries in the last quarter.

Cast Iron Pipe.—The most important lettings mentioned since last report involve 5,000 tons of water pipe for the requirement at Milwaukee, Wis., which were placed with the North Birmingham plant of the United States Cast Iron Pipe & Foundry Co., and 500 tons of water pipe for Pueblo, Colo., which were placed with the Anniston, Ala., plant of the same concern. Aside from

this several lots of 250 to 400 each, were placed, on which specific information is not furnished. The advance so far effected in prices is not sufficient to warrant any change. Quotations on water pipe are as follows, per net ton, f. o. b. cars here, viz.: Four-inch, $23.50; 6-inch and up, $21.50, with $1 per ton extra for gas pipe.

Old Material.—Some 1,000 tons of furnace scrap, consisting of miscellaneous grades, were sold to dealers in the past week, and negotiations for some 2,500 tons additional will probably be closed today. Recent buying on the part of consumers has been very light comparatively, and the movement has been affected accordingly, although values have not decreased. This last condition is, of course, in line with the continued strength in the pig iron market, and to the advances that are being maintained for the finished products. With hardly sufficient business being transacted to afford a correct line on prices, the schedule below is considered nominal, but the basis for the market is no doubt firm. We quote prices dealers are asking for their holdings, as follows, per gross ton, f. o. b. cars here, as follows:

Old iron axles (light)	$15.50 to 16.00
Old steel axles (light)	12.00 to 12.50
Old iron rails	12.00 to 12.50
No. 1 R. R. wrought	12.00 to 12.50
No. 2 R. R. wrought	10.50 to 11.50
No. 1 country	8.50 to 9.00
No. 2 country	6.50 to 7.00
No. 1 machinery	9.00 to 9.50
No. 1 steel	9.50 to 10.00
Tram car wheels	8.50 to 9.00
Standard car wheels	10.50 to 11.00
Light cast and stove plate	7.00 to 7.50

METAL MARKETS

Tin Advances—Copper Inactive

New York

Aug. 20.

Copper.—There is not much activity in this market at present and the tendency is to wait for developments. Electrolytic in second hands sold yesterday at 17.55c to 17.60c, while the producers adhere firmly to 17.75c, 30 days delivery. A premium of 5 to 7½ points is asked on spot for August shipment. Lake is held at 17.62½c to 17.75c, cash, and casting at 17.37½c to 17.50c, 30 days delivery. Today's London closing price is £78 17s 6d for spot and three months, compared with £78 12s 6d a week ago. Copper exports since Aug. 1 are 14,738 tons.

Tin.—Today's close on the London standard tin market was £211 15s for spot and £209 10s for three months, compared with £207 for spot and £205 for three months a week ago. While consumption is heavy, there is no adequate explanation for this advance as the statistical position is also good. Tin arrivals since Aug. 1 are 3,606 tons, while 1,775 tons are afloat. Today's closing price in New York is 46.60c for spot, compared with 45.75c a week ago.

Antimony.—This metal remains dull but the price is upheld steadily. Cookson's is held at 8.50c to 8.75c, Hallett's at 7.87½c and Hungarian and Chinese at 7.62½c to 7.75c.

Lead.—The leading interest continues to ask 4.50c, while independent sellers quote from 4.50c to 4.55c. The demand is dull.

Chicago

Aug. 19.

New Metals.—The demand for new metals in this territory continues good, but with shading on several items. Lead is stronger and spelter changed but little. Increases in business are largely affecting the market and dealers report an upward tendency. We quote, dealers' selling prices, f. o. b. Chicago, as follows:

Lake copper, carload lots, 17½c; casting, 17¼c; smaller lots, ¼c to ¾c higher. Spelter, car lots, 6.75c; lead, desilverized, 4.40c in 50-ton lots; corroding, 4.65c; sheet zinc, 8.75c, f. o. b. La Salle, in car lots of 600-pound casks; pig tin, 45.62½c; Cookson's antimony, 8¾c; other grades, 7½c.

Old Metals.—There are no changes in quotations on old metals over those of the previous week and the demand continues unchecked. The increases in business which affect new metals are producing a like result in old material and a strong upward tendency is predominant.

We quote, dealers' selling prices, f. o. b. Chicago, as follows:

Copper wire, crucible shapes, 14½c; copper bottoms, 13½c; heavy red brass, 11¾c; heavy yellow brass, 9¼c; No. 1 red brass borings, 11½c; No. 1 yellow brass borings, 8¾c; brass clippings, 9¼c; lead pipe, 4c; zinc scrap, 5¼c; tea lead, 3¾c; No. 1 aluminum, 16c; No. 1 pewter, 30c; block tin pipe, 40c; tin foil, 37c; linotype dross, 3⅛c; electrotype dross, 3⅞c; stereotype plates, 4¼c; stereotype dross, 3⅛c; prime slab zinc dross, $100 a ton.

STEEL DIVISION

Of Mining Engineers Will Hold Meeting in Cleveland.

An exceedingly comprehensive program has been outlined by the iron and steel division of the American Institute of Mining Engineers, for the meeting which will be held at Cleveland in October. A large number of papers will be presented on topics relating to iron and steel manufacture, which include the following:

"Notes on Ruff's Carbon-Iron Equilibrium Diagram," by Henry M. Howe, New York, N. Y.

"The Case-Hardening of Special Steels," by Albert Sauveur and G. A. Reinhardt, Cambridge, Mass.

"The Heat-Treatment of Special Steel," papers by Henry M. Howe, New York City; R. R. Abbott and Mark Ammon, Cleveland.

"The Effect of Alumina in Blast Furnace Slags," by J. E. Johnson Jr., Ashland, Wis.

"Blowing-in of Blast Furnaces," by Ralph H. Sweetser, Columbus, O.

"Blast Furnace Air Pressures," by J. E. Johnson Jr., Ashland, Wis.

"The Utility of Efficiency Records in the Manufacture of Iron," by John J. Porter, Staunton, Va.

"A Novelty in Open-Hearth Steel Furnace Practice," by N. E. Maccallum, Phoenixville, Pa.

"Notes on Titanium and on the Cleansing Effect of Titanium on Cast Iron," by Bradley Stoughton, New York City.

"Cuyuna Iron Ore Range," by Walter A. Barrows Jr., Duluth, Minn., and Carl Zapffe, Brainerd, Minn.

"Method of Surveying and Sampling Diamond Drill Holes," by E. E. White, Glen White, W. Va.

"The Concentration of Iron Ores," by N. V. Hansell, New York City.

"Iron Ore," by Dwight E. Woodbridge, Duluth, Minn.

"The Concentrating and Briquetting Plant of the Moose Mountain, Ltd.," by Chas. E. Hermann, New York City.

"The Use of Schumacher Briquettes in the Johnstown Blast Furnaces," by Joseph W. Richards, So. Bethlehem, Pa.

"Rational Cupola Practice," by Richard Moldenke, Watchung, N. J.

"The Manufacture of Coke," papers by F. E. Lucas, Sydney, C. B., W. H. Blauvelt, Syracuse, and C. W. Andrews, Duluth, Minn.

"The Heat-Treatment of Steel Castings," by C. D. Young, Rolla, Mo.

"Notes on the Structure of Steel," by Wm. Campbell, New York City.

At a meeting of the council of the American Institute of Mining Engineers the president announced the following nominating committee which will present names for the officers of the institute to be voted upon at the annual meeting Feb. 18, 1913: Philip N. Moore, St. Louis, chairman; John Birkinbine, Philadelphia; David W. Brunton, Denver, Colo.; Seeley W. Mudd, Los Angeles; Chas. P. Perin, and Arthur L. Walker, New York City.

BUILDS IN WEST

Champion Rivet Co. Lets Contract For East Chicago Works.

Contract was awarded Tuesday afternoon by the Champion Rivet Co., Cleveland, to Worden-Allen Co., Milwaukee, for the erection of buildings which will constitute the first unit for a rivet works at East Chicago. A full line of rivets will be manufactured there. The statement is made by President David Champion that the Cleveland works will be maintained but that orders for western shipment will be filled from the East Chicago works. Plans for this new plant have been under way for some time, and the machinery has been assembled at the Cleveland works. Construction of the buildings will be commenced as soon as practicable. It is expected to add to the first unit from time to time as business develops.

Purchases Flexotype Company

The American Multigraph Co., Cleveland, has purchased all of the property of the Flexotype Co., Burlington, N. J. There had been some litigation between the two companies for some time. The Multigraph company claimed infringements on its patents and had won two decisions. The Flexotype Co. was incorporated in 1910, its officers being president, S. A. Neidich; treasurer, J. W. Davis; secretary, S. S. Garwood; sales manager, R. G. Rankin. The American Multigraph Co. was incorporated in 1902 and has enjoyed a rapid growth. Its officers are: President, H. C. Osborn; treasurer, W. C. Dunlap; secretary, R. G. A. Phillips; sales manager, L. W. Jared.

Revise Steel Specifications

The Association of American Steel Manufacturers has announced a revision of the manufacturers' standard specifications for structural and boiler steel. The present schedule has been in effect since 1903. The revisions are made to standardize the physical and chemical requirements for steel.

The Morris Engineering Co., Philadelphia, has taken over the Geo. V. Cresson Co., of that city, which has been in the hands of receivers for a number of months, and will concentrate its operations in the plant of the latter company. The combined assets of the two companies will be about $1,200,000. The Cresson company has been manufacturing power transmission and mining machinery and the Morris company is a manufacturer of sugar-making machinery, etc.

CORPORATION PRICES

Below Those of Some of the Independent Companies.

New York, Aug. 21. (By wire.)—Some of the leading steel makers continue to exert their influence against too rapid advances in finished lines to guard against dangers of a runaway market. The United States Steel Corporation is still quoting 1.35c, Pittsburgh, on shapes and plates and 1.30c on bars, and has been accepting business on this level. Independent makers pretty generally have established their quotations at $1 or more above this schedule.

Danbury Hatters' Case

The famous Danbury hatters' boycott case, which first came to trial on Oct. 13, 1909, is again up for a hearing before United States District Judge James L. Martin, of Brattleboro, Vt. This case is the suit of D. E. Loewe & Co., Danbury, Conn., against Martin Lawler and 240 other members of the United Hatters of America for damages for causing an alleged boycotting of the Loewe product by the union hatters all over the country some 10 years ago. The complaint in the suit was first filed Aug. 31, 1903. Since that time the number of defendants has grown smaller by at least 50, some having died and others having left the union. The jury in the first trial awarded damages to the amount of $220,000 to the Loewe company.

Higher Prices on Small Sales

Pittsburgh, Aug. 21. (By wire.)—A small tonnage of southern No. 2 foundry iron was sold today by a local broker at $13, Birmingham, for delivery over the remainder of the year. This is $1 a ton over the maximum price at which this grade has been quoted. A small tonnage of No. 2 foundry iron was sold today at $14.25, valley, for delivery this year, 25 cents above the prevailing maximum. The iron, however, was unusually high in silicon. Other prices are firm.

The Wabash railroad has placed an order with the American Locomotive Co. for 20 Mikado locomotives of a total weight in working order of 170,000 pounds.

OUTINGS HELD

By Employes of Inland Steel and Dodge Mfg. Companies.

Chicago, Aug. 20.—The third annual picnic of the employes of the Inland Steel Co. was held in Michigan City, Ind., on Monday, Aug. 19. A specially prepared program was followed, comprehending 12 athletic events. Following the practice pursued by other companies, the Inland strives to make this event the most enjoyable of the year and those who attended in Michigan City report an unusually satisfying time. The sixth annual outing of employes of the Dodge Mfg. Co. will be held Thursday, Aug. 22, at South Bend, Ind. An interesting program of sporting events and a children's pageant has been arranged.

Car Maker in Market for Large Tonnage

Cincinnati, Aug. 21. (By wire.)—A large central Ohio car manufacturer is in the market for 23,000 tons of malleable pig iron and 37,000 tons of northern and southern foundry iron for last quarter and first half of next year.

Car Builder Buys

St. Louis, Aug. 21. (By wire.)—Sales were made Tuesday of 10,000 tons of car wheel iron and 1,000 tons of malleable to a leading car manufacturing company.

Death of Frank J. Mulcahy

Frank J. Mulcahy, vice president and general manager of the Crane Valve Co., Bridgeport, Conn., died at Bridgeport Aug. 19, following an operation for appendicitis. He was 53 years of age. Mr. Mulcahy began business life as a telegrapher for the Pennsylvania railroad and later entered the employ of the Deering Harvester Co., of Chicago. He resigned this connection to become purchasing agent of the Chicago World's Fair, a position which he filled with such marked ability and success that he was invited into the service of the Crane Co. and became its purchasing agent. In 1905, he was sent to Bridgeport to take charge of the eastern interests of the Crane Co. He was a member of numerous clubs, including the Engineers, Machinery and Hardware clubs of New York City.

A Highly Specialized German Steel Plant

Description of the Becker Works Which Manufacture High Grade Carbon and Alloy Steels by the Crucible, Open-Hearth and Electrical Furnace Processes

In Germany the tendency in the steel industry is toward specialization and the output of the more recently-built plants is confined to a comparatively few high grade products. The Stahlwerk Becker, Aktiengesellshaft, located at Willich, Germany, about six miles from Krefeld, specializes in the manufacture of high grade carbon and alloy steels for seamless tubes, high speed tools, automobile parts, armor plate, etc.

The site comprises 43 acres which is covered by a group of brick buildings of substantial construction and attractive appearance. This touch of the artistic and the effort toward obtaining an attractive appearance of plant buildings and property is reflected everywhere around these works. A massive brick wall entirely surrounds the property, imparting to it the appearance of a private park or estate. The administration building, which is an imposing structure, is especially attractive in interior finish and arrangement. Here are located the commercial and technical offices. The physical comfort of the workmen was given careful consideration in the erection of the plant and in a separate building is located a large dining hall where the employes eat their noonday meal. Individual lockers also have been installed as well as model bath and wash-rooms.

The Becker plant was designed and built under the supervision of Reinhold Becker, managing director, who has been identified with the manufacture of high grade steel in Germany for a period of 30 years, formerly having been connected with the Bismarckhuette and the Krefelder Stahlwerk. Steel is manufacturd by the open-hearth, crucible and electric furnace processes and the annual capacity of the plant is about 23,000 tons of tool and high speed steels, machinery and ball steel, armor plate, gun barrels, etc. One of the specialties of the plant is chrome steel, seamless drawn tubing.

Layout of the Plant

A ground plan of the plant is illustrated in Fig. 16 and it will be noted that the various buildings and departments are grouped about a center thoroughfare. On one side are located the shops and equipment for handling the material in the preparatory stages of manufacture, together with the power units for the entire plant. On one side of this thoroughfare are located the open-hearth furnaces, rolling mills, power plant and forging department. On the opposite side are the finishing departments, including the wire mill, tube plant, machine shops, annealing and heat treating departments, physical and chemical laboratories, and the shipping department. One of the two machine shops is engaged in finishing such products as crank shafts, gears, machinery parts, etc., while the other is devoted to the manufacture of equipment for plant renewals and for repairs.

Steel is melted by the open-hearth, crucible and electric furnace processes, Swedish melting stock being largely employed. The crucible furnaces are gas-fired, the gas being generated by the company's plant of three producers. The crucible furnaces have a capacity of 30 to 40 pots each, and an interesting feature of these operations is that

FIG. 1—GENERAL VIEW OF THE MERCHANT MILLS, SHOWING THE MOTOR DRIVE AT THE LEFT

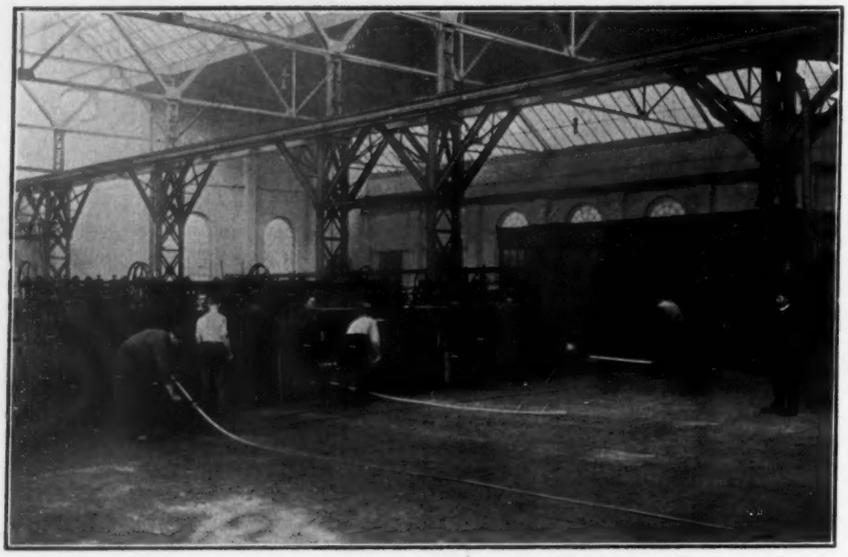


FIG. 2—A VIEW OF THE MERCHANT MILL OF THE BECKER PLANT AT WILLICH, GERMANY

FIG. 3—MOTOR-DRIVEN MILL FOR BREAKING DOWN BILLETS

FIG. 4—CONTINUOUS ROD MILL

crucibles are not purchased, but are manufactured at these works. The material from which the crucibles are made varies with the grade of steel that is to be produced. Both clay and graphite are employed and after being ground, this crucible material is molded into a cylindrical mass. A sufficient quantity for one pot is placed vertically in a metal mold and a crucible is formed by an hydraulic plunger which compresses the mass between the body of the plunger and the wall of the mold. After finishing the pot by hand it is subjected to a preliminary baking in an oven at a low temperature and subsequently it is transferred to another oven where the baking operation is continued at a higher temperature until the pot has attained its desired degree of solidity. Crucibles of one size only are manufactured and these have a capacity of 150 pounds. The crucible manufacturing department is illustrated in Fig. 15.

Machined Ingots

The two electric furnaces, which are of the Girod type, are employed almost exclusively for the production of alloy steels. The furnaces are of the resistance type, this method being preferred to the electric arc to facilitate the starting of operations with cold charges. Electric steel which is cast into large ingots for armor plate, large forgings, etc., is partially refined in open-hearth furnaces before it is charged into the electric furnace for the final refining process. The electric furnaces have a capacity of 3,000 to 3,500 pounds each. This department is served by an electric traveling crane of 15 tons capacity and a span of 78 feet.

All of the ingots cast at this plant are cylindrical in form and are rough-machined for the purpose of removing surface defects before they are broken down to billets by steam hammers. This method of casting round ingots, followed by the rough-machining process, has been found to much more effectively eliminate surface imperfections than can be accomplished by chipping hammers. The extent of the machining operation depends entirely upon the surface condition of the ingots which are cast cylindrical in form to facilitate the machining operation. A view of the machine shop devoted largely to the rough-machining of ingots is illustrated in Fig. 11. The ingots vary in size, depending entirely upon the size and form of the finished product. All the ingots are forged before being rolled, and, for example, if a ¾ inch square bar is desired, an ingot 3

inches in diameter is cast which is forged to a 2-inch billet before being rolled. An ingot 4 inches in diameter is usually reduced to a diameter of about 3 inches before rolling. The ingot forging department is equipped with nine steam hammers, varying in capacities from 200 to 6,000 pounds. Recently there was installed in this department a large hydraulic press capable of exerting 1,000 tons pressure. This press will serve in the nature of a blooming mill.

Continuous Heating Furnace

After being rough-machined, the ingots are heated in a furnace, 50 feet long, 8 feet wide and 6 feet high. The furnace oven is inclined and the furnace interior is divided into numerous compartments, each of which is heated to a different temperature, the ingot being subjected to the greatest heat in the bottom division. The ingot is charged into the furnace at the high point of the incline where the furnace temperature is lowest. After having attained the maximum temperature in this compartment, the ingot is rolled into the adjoining compartment where it is subjected to a slightly increased temperature. From this compartment the ingot continues from one furnace division to another until it has attained the maximum temperature desired in the last compartment and from which it is discharged for the subsequent forging operation. Approximately four hours are required to heat an ingot in this way. This method insures the uniform distribution of heat throughout the mass of steel, the exterior and interior invariably being of approximately the same temperature. This insures good results in the subsequent rolling and finishing operations. After the ingot is reduced to a billet in the forging department, it is chipped and after pickling, is delivered to the rolling mill.

Rolling Mills

The rolling mill equipment consists of one train of three stands of rolls for breaking down billets, one train of seven stands of three-high rolls for rolling bars and one train of eight stands of rolls for rolling rods. The largest finishing mill has a capacity for rolling rods from 1¼ to 5 inches in diameter, flats from 2 x ⅜ to 6 x 1 inches, and squares up to 4½ inches. The mill for breaking down ingots is illustrated in Fig. 3 and the bar mill is shown in Fig. 1. All of the mills are motor-driven, while the continuous rod mill, Fig. 4, is of the German type, having been built by Beckem & Goctman, of Druisburg. It

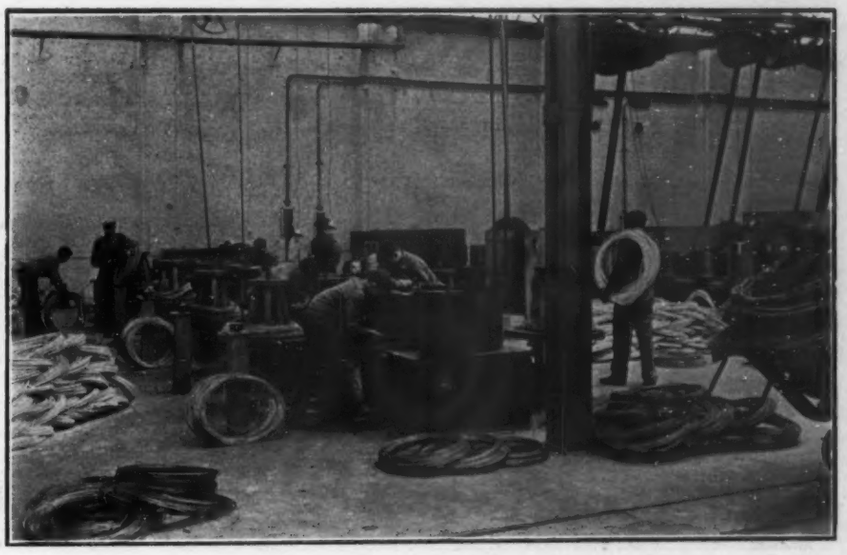


FIG. 5—THE WIRE DRAWING DEPARTMENT

FIG. 6—TAPPING ONE OF THE ELECTRIC FURNACES

FIG. 7—THE CRUCIBLE STEEL MELTING DEPARTMENT

FIG. 8—BREAKING DOWN AN INGOT BY A STEAM HAMMER BEFORE ROLLING

FIG. 9—THE SEAMLESS STEEL TUBE DEPARTMENT, SHOWING THE HYDRAULIC DRAWING BENCH AT THE LEFT AND THE BILLET HEATING FURNACE AT THE RIGHT

FIG. 10—A VIEW OF THE ANNEALING DEPARTMENT, SHOWING THE PITS IN WHICH THE ANNEALING BOXES ARE COOLED

is similar in design and method of operation to the continuous rod mills employed in American works. The billet is inserted in the first of the eight stands of rolls and is directed automatically by guides through each succeeding stand until it emerges from the final pass in rolled form and is reeled. The mills are commanded by two traveling cranes of 10 tons capacity each.

Not only wire, but various sizes of round bars are manufactured in the drawing department which contains 12 benches for drawing rods into sizes varying from 3-16 inch to 3 inches in diameter. There are 10 wire drawing benches for the production of various sizes of wire from exceedingly fine or No. 80 to wire ½ inch in diameter. The benches are arranged in groups and are motor-driven. In addition, the equipment of this department includes straightening machines, pickling vats and annealing furnaces. A specialty also is made of cold drawn carbon and alloy steel bars for the manufacture of steel balls for bearing purposes.

Seamless Steel Tubes

The Becker works has the distinction of being one of the largest plants for the production of high carbon, chrome steel seamless tubing. The billets for the manufacture of these tubes vary in diameter from 1¼ to 5 inches. After heating, the billets are pierced by a mandrel and then are extended by a hydraulic drawing bench. This bench is employed for cold as well as hot drawing. Views of the seamless tube department are shown in Figs 9 and 15.

The annealing department is of large capacity, as all the finished products are subjected to heat treatment which varies in accordance with the particular product and the specifications of the steel. A sectional view of one of the annealing departments is shown in Fig. 14. The equipment of the physical laboratory is unusually complete. Hardness tests are made by the Brinnel process, diamond scratching, etc., and machines are provided for measuring the tensile strength, elastic limit, etc.

Power Plant

The power plant is equipped with three steam engines of an aggregate capacity of 2,500 horsepower; the engines being direct-connected to generators. Steam is generated by eight boilers and coal is delivered to the boiler room from hoppers which are filled by cars operated by an overhead electric trolley system. Cars of the bottom discharge type are employed

and their contents are discharged into three sets of hoppers, one receiving coal for the boilers of the central power plant, the second the fuel for the gas producer plant serving the reheating furnaces in the rolling mills, and the third the coal for the gas producers in the forging department. In the power plant there has recently been installed a turbo-generator set driven by waste steam which has a capacity of 2,500 horsepower.

The Stahlwerk - Becker, Aktiengesellshaft was incorporated Aug. 15, 1908, with a capital of 500,000 marks, which was increased in 1910, to 3,500,000 marks. In addition, bonds amounting to 1,500,000 marks have been issued. The products of this plant are sold in the United States by the Becker Steel Co., Inc., 90 West street, New York City. Warehouses are maintained in several large cities as well as in Canada.

Hydro-Electric Station at Gatun Spillway

Specifications and requisitions for auxiliary electrical equipment for the Gatun hydro-electric station of the Panama canal have been forwarded recently to Washington, and include switchboards, oil switch group, station battery, light and power transformers, and an air compressor. Sufficient equipment will be purchased for three complete generating units. This will make the second installment of machinery required for this project, the first contracts having embraced the hydraulic equipment, with the electric generators and exciters. The purpose of this waterpower project is to utilize the surplus water of Gatun lake to supply electrical energy for the canal zone, and it is anticipated that there will be sufficient water available to warrant the installation of 6,000 kilowatts in generating capacity, including reserve. The average head throughout the year will be approximately 75 feet, the elevation of the tail race being about 8 feet above sea level. Water will be so plentiful during the rainy season that it will be wasted over the adjacent spillway, but in the dry season it will be necessary to draw upon the storage in Gatun lake, above elevation plus 79.

Distribution of Electrical Energy

The maximum quantity of water diverted for hydroelectric purposes is approximately 7 per cent of the minimum water supply and is the excess that is not required for lockages, evaporation and leakages. Water will

FIG. 11—SHOP FOR ROUGH MACHINING THE INGOTS

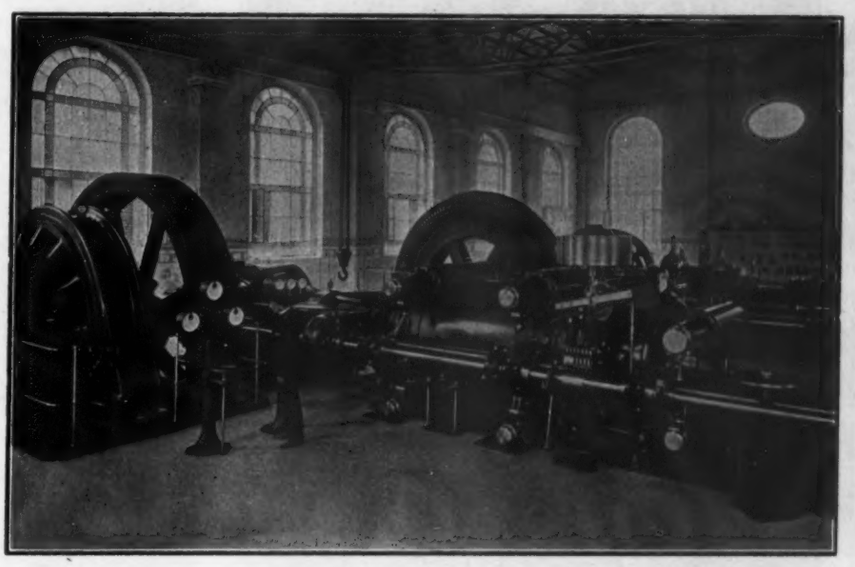


FIG. 12—A VIEW OF ONE SECTION OF THE CENTRAL POWER PLANT

FIG. 13—CRUCIBLE MANUFACTURING DEPARTMENT

be extremely abundant for several years, until such a time when the traffic through the canal approaches full capacity. Electrical energy will be distributed by the station to the machinery of the three locks, to the dry dock, the permanent machine shops, the coal handling plant, batteries and for lighting the locks and zone towns. The station will be connected by means of a high voltage transmission line to the present steam generating station at Miraflores, which station will be held in reserve to tide over either shut down, or low water periods of the Gatun station.

The hydroelectric station will be located adjacent to the north wall of Gatun spillway. The building will be rectangular in shape, and constructed of concrete and steel; it will be sufficiently large to accommodate the present installation of three, 2,000-kilowatt units, and provision will be made for a future extension of three additional units of the same size. The equipment will include a 30-ton crane to facilitate the erection and repair of the machinery. The building, with the machinery and electrical equipment is laid out on the unit principle. Each unit consists of an individual head gate, penstock, governor, generator, exciter, oil switch and control panel. Water will be taken from the lake through a forebay in such a manner that floating debris will be held back from the head gates. The water will be carried to the turbines, through three steel plate penstocks, protected by cement against corrosion and superimposed earth pressure.

The entrance to the penstocks will be closed by cast iron head gates and bar iron trash racks to prevent the entrance of sunken debris. The head gates will be raised and lowered by individual motors, controlled from the station switchboard by reversing contactors with interlocks, limit switch and a float switch, all working automatically.

The turbo-generator units are of the vertical type, the rotating element being suspended from an overhung thrust bearing, supported by the top shield of the generator. The turbine will be set in a heavy masonry foundation, the generator being superimposed upon the turbine casting. Each turbine is rated at 2,250 kilowatts at a speed of 250 revolutions per minute, and will consume approximately 500 second feet of water at full load. The generator is to be rated at 2,000 kilowatts, and will deliver 3-phase, 25-cycle current at 2,200 volts potential. The outgoing feeders emerge from the lower part of the generators and pass through a man hole at the base of the turbine into a duct line, which carries the cables to man holes in the cable vault; from this point the leads are taken up the building wall in tile ducts to the generator reactances. The reactances are to give protection to the generator in the event of severe and protracted short circuit outside the machines, and consist of air-insulated coils mounted upon concrete cores. As far as practicable, the entire electrical equipment is in duplicate.

FIG. 14—A VIEW OF THE HEAT TREATING SHOP, SHOWING THE GAS AND SALT BATH FURNACES

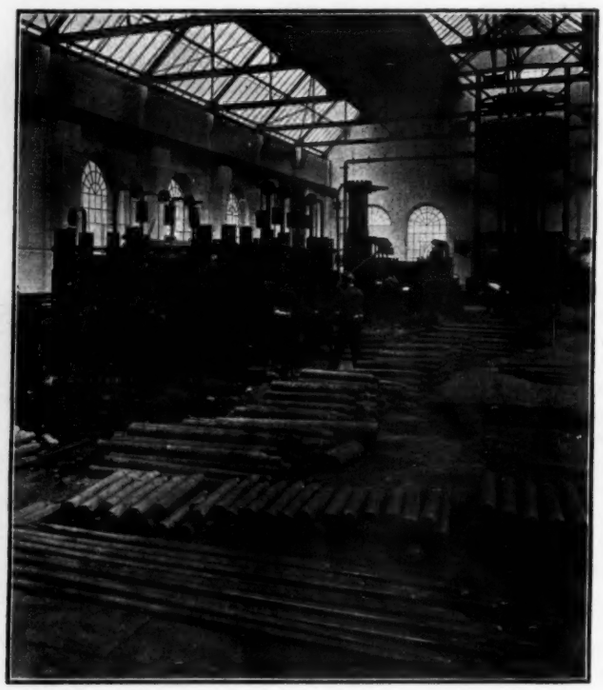


FIG. 15—ANOTHER VIEW OF THE SEAMLESS STEEL TUBE DEPARTMENT, SHOWING FURNACES AND ACCUMULATOR

Steaming Capacities of Boilers

The United States Bureau of Mines in a bulletin recently issued, makes the statement that the present steaming capacities of steam boilers can be tripled or quadrupled by forcing over the heating surface three or four times the weight of gases now passed over them.

"With well-designed mechanical-draft apparatus this greater weight of gases can be forced through the boilers at small operating cost," the bulletin states. "It is possible to increase the capacity of many of the present boilers in this way without reducing their efficiency to any extent; in fact, by proper arrangement of the heating surfaces, the efficiency can be made higher than the present rating. The efficiency of any boiler can be increased by arranging its heating surfaces in series with respect to the path of hot gases. New boilers of high efficiency can be con-

structed by making the cross-section of the gas passages small in comparison with the length."

These statements are contained in a bulletin entitled "The Transmission of Heat into Steam Boilers," the authors being Henry Kreisinger and Walter T. Ray. The investigation of the transmission of heat into steam boilers is one of several researches now being carried on by the bureau of mines that have for their object the testing of methods by which the mineral fuels in this country may be used more efficiently. A better understanding of the laws governing heat transmission into boilers will result in the design of more efficient boilers, and more efficient boilers will reduce present wastes in the use of fuel.

The bulletin contains the following:

"Nearly 100 years of practical investigations of boiler and furnace problems have resulted in little advance. Perhaps the main reason why many of the investigations failed to bring about progress was that boiler and furnace were considered a unit and were investigated together. Various combinations of boilers and furnaces have been built and tested without thoughtful planning. Many of the published results of such tests confuse the performance of the boiler and the furnace in such a way that it is difficult, if not impossible, to tell which of the two should be blamed or praised for the poor or good results obtained from the combined apparatus. Evidently, many persons have thought that the combined efficiency could be greatly increased by some mysterious manipulation.

"The principles governing the combustion of fuel in boiler furnaces and the absorption of heat by boilers have been little understood. The dogmas that the area of grate should have a certain ratio to the area of the heating surface, and that it takes 10 square feet of heating surface to make one boiler horsepower, seemingly had become so thoroughly fixed that they were hardly ever questioned. It is only within the last decade that a few engineers have broken away from the old rule-of-thumb methods and have begun to investigate the functions of the boiler and furnace separately. Their studies seem to mark the beginning of advance in steam-generating apparatus.

"The boiler is the metallic vessel that contains water and steam and absorbs heat; consequently it should be studied as a heat absorber.

"The furnace is that part of the steam-generating apparatus in which the potential energy of the coal is changed into heat; consequently it should be studied as a heat generator."

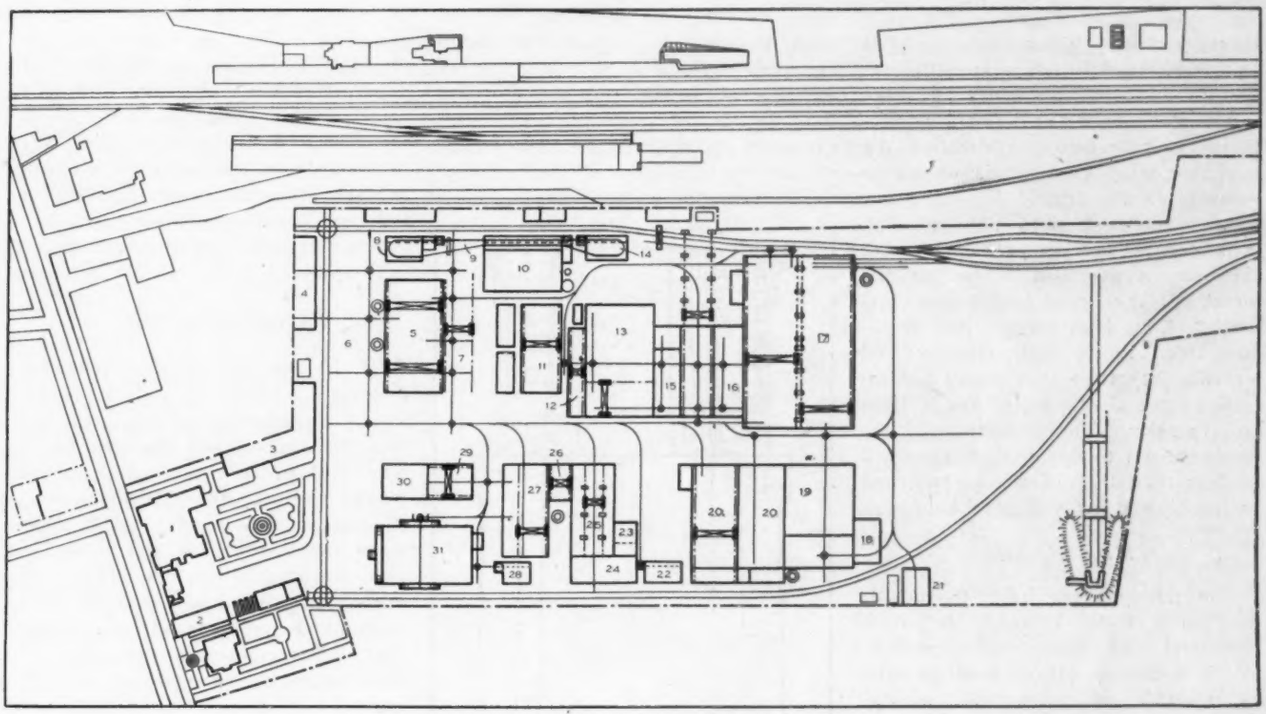


FIG. 16—GROUND PLAN OF THE BECKER STEEL PLANT

Ground Plan Legend: 1, office; 2, dining room; 3, bath and wash rooms; 4, crucible making department; 5, steel works; 6, pig iron storage; 7, billet storage; 8, producer gas plant; 9, overhead electric trolley; 10, boiler house; 11, machine shop; 12, shop for machining billets; 13, forging department; 14, producer plant; 15 and 16, billet storage Nos. 1 and 2; 17, rolling mill; 18, roll storage; 19, wire mill; 20, seamless steel tube plant; 21, pump house; 22, producer plant for the seamless steel tube works; 23, electric station; 24, armor plate department; 25, mechanical department; 26, repair plant; 27, annealing department; 28, producer gas plant for the annealing department; 29, hardening plant; 30, inspection department; 31, steel storage and stock department.

Annual Meeting of Institute of Metals

The annual meeting of the Institute of Metals will be held in London, Eng., Sept. 25 and 26, at the Institution of Electrical Engineers. Professional sessions will be held during the mornings of both days, while on Wednesday afternoon the members will be afforded an opportunity to visit the works of Fraser & Chalmers, Ltd., and the National physical laboratory. In the evening a reception will be tendered the visitors at the Royal United Service Institution. On Thursday an alternative excursion will be held, one being to Woolwich Arsenal by special steamer and the other being a visit to the Brooklands motor race course and aviation ground.

The motors and generators installed in the engineering building of the Cincinnati university, which was described in THE IRON TRADE REVIEW, Aug. 8, 1912, were furnished by the Triumph Electric Co., Cincinnati.

The Process of Manufacturing Large Guns

How the Steel is Melted and Cast, With the Subsequent Forging, Annealing and Tempering Operations

By Gen. L. Cubillo

If it were possible to produce a metal at low cost which possesses a high elastic limit, and also high tenacity, great ductility, and resistance to the wear produced by powder gases at great pressure and high temperature, with, moreover, a very high melting point, such a material would undoubtedly be the most suitable for the manufacture of guns. The very great pressure which the material must withstand is not of great duration or of great frequency in large and medium-sized guns; but it is necessary to take into consideration the fact that what causes this enormous pressure is the highly heated gases, which exercise both a physical and, in a certain portion of the bore of the gun, a chemical action on the metal. If the metal is ordinary carbon steel, its high elastic limit is accompanied by a high tenacity and less ductility than that which accompanies a metal of smaller elastic limit and tenacity. The resistance of the former metal to dynamic stresses will be less than that of the second, and its melting point will also be lower.

Metal Adopted

The gun makers have universally adopted a metal between the dead-soft and the hard steels, namely, an iron-carbon alloy, tending rather towards mildness, due specially to its high melting point. This last property is now very important, on account of the use of the modern smokeless powders, and especially the nitro-glycerine powders. The modern experiments of Vielle and some others made at South Bethlehem, not to mention the earlier ones made by Sir Andrew Noble, have demonstrated without doubt that the mild steels are better able to withstand the effects of erosion, because, among other properties, they possess melting points higher than those of the hard steels.

An ordinary carbon steel for guns has about 0.5 per cent carbon, and its place in the iron-carbon solution is in the series of the metals called steels having a carbon percentage of less than 2 per cent. The ternary alloy of iron-carbon and nickel or the quaternary alloy of iron with carbon, chromium and nickel is employed in the manufacture of medium and small guns only, because the cost of such an alloy would be prohibitive in the construction of the larger ones, especially now that the principle of uniformity of caliber has been adopted by all the navies of the world. However, the A and B tubes for the great 16-inch experimental guns manufactured in the United States are of nickel steel. In adopting this alloy for the construction of guns it has been necessary to diminish the percentage of carbon, because if it reached that of ordinary carbon steel with percentages of 2.5 to 3.5 per cent of nickel the steel would be very hard.

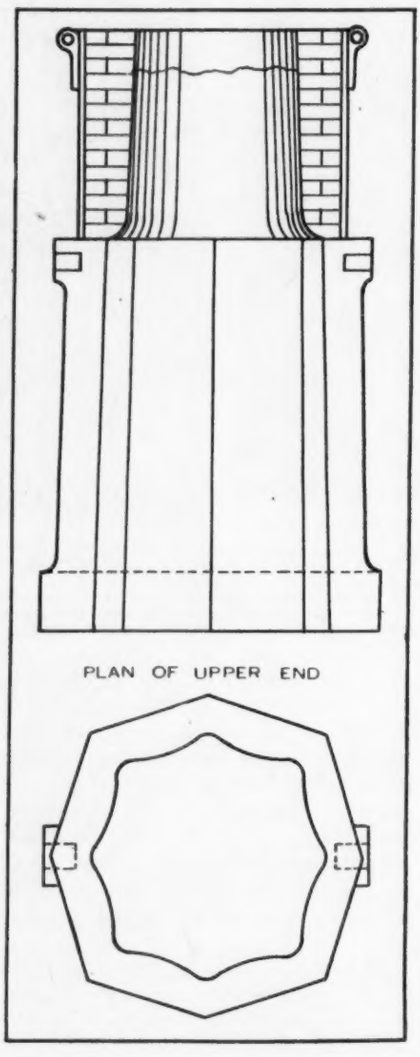


FIG. 1—MOLD IN WHICH STEEL FOR GUNS IS CAST

It is not necessary to give a complete table of the specifications for gun steel as required by the armies and navies of the European and American powers. In all the specifications two different kinds of mechanical tests are required. In the one case, that of continuous and progressive tension up to the yield point, together with the measurement of the elongation after breaking; while the other test consists in subjecting the test piece to a certain number of impacts according to details and conditions fully specified, or perhaps to some bending test, equally fully specified.

Melting the Steel

Of all the processes employed in melting the steel, the only ones used in the manufacture of gun steel have been the crucible and the open-hearth. The first process was naturally employed before the introduction of the open-hearth method, and for some time afterwards; but the latter has now superseded the crucible process, except at the Krupp works. The firm of Krupp has always claimed that the crucible process offers the best guarantee for a sound metal for gun construction. Undoubtedly it is possible to obtain by it a metal of greater purity with regard to phosphorus and sulphur than by any other process, if the material charged in the crucibles is wrought iron. The metal obtained in this case will be the best possible steel and it will not contain occluded gases; or at all events in very small proportion.

In the author's opinion steel made by the crucible process must lack homogeneity, because it is almost impossible that the composition of the charge of all the crucibles will be the same. It is also impossible to secure uniformity of composition in the ingot mold, bearing in mind segregation. The only way of securing homogeneity by this process would be to teem the crucibles first into a hot ladle and then into the ingot mold. The principal reason for this lack of homogeneity lies in the im-

[1]From a paper presented before the Iron and Steel Institute of Great Britain.

possibility of analyzing all the puddled bars which form the charge of the crucibles, classification by the eye being very uncertain. Therefore, in the author's opinion, a massive ingot of steel cast by the crucible process is more heterogeneous than a similar ingot cast by the open-hearth process. The open-hearth acid process is generally employed for the casting of great masses of steel. The basic process can of course be employed, provided the materials charged are acid; and there is no difficulty in obtaining by the open-hearth process, that is, by the dissolution in a cast-iron bath of a certain quantity of wrought iron or steel, a very pure metal, such as is required in the construction of guns. All depends on the purity of the pig iron and scrap charged.

It is the constant practice of all the steel works where steel for gun construction is regularly made to employ Swedish pig iron of the best quality, the phosphorus being as low as 0.025 per cent and the sulphur lower than this amount; and for the scrap, puddled balls or bars from the best hematite pig irons.

Use of Puddled Pig Iron

By puddling this pig it is possible to obtain a product with phosphorus and sulphur as low as 0.001 per cent, and as furnaces of 50 or 60 tons capacity are now very common, and as for the casting of the largest element of the new great guns it is not necessary to have ingots of more than 100 or 120 tons, the result is that it is not very difficult to obtain a great uniformity of the metal by this process. The conditions of open-hearth working permit of working two or three furnaces so uniformly that, at the time of casting, the metal of the two or three furnaces will be perfectly similar. The steel is much exposed to the oxidation of the furnace gases, always in contact with the bath; and to this action is added that of the iron ore incorporated for oxidizing in a rapid and energetic manner the silicon and carbon in excess of that required in the steel. There are many means of diminishing the oxidation of the bath; one of them is to prepare the charge by putting in the furnace the greatest possible amount of scrap, with the smallest quantity of carbon, and conducting the refining process by the furnace gases only, without the addition of any iron ore. This particular method of working is extraordinarily slow; first, because as the materials, both pig iron and slag, are charged at once and cold, the mixed bath is very low in carbon and its melting point very high. It therefore requires more time for melting it than if the charge had been composed of equal parts of pig iron and scrap. Secondly, because the oxidation of the carbon by the gases is not so efficacious as that by the iron ore, this being more in contact with the bath and the former acting only on the surface. Operating in this way the final steel is almost free of oxides, and in order entirely to eliminate them additions are made at the end of certain iron alloys, such as ferro-manganese and ferro-silicon, which by their action upon the bath reduce the iron oxides dissolved in it.

In the fusion of the ordinary carbon steel for guns, the materials employed are Swedish pig iron and puddled ball from pig iron. In order to convey an idea of the operation, a

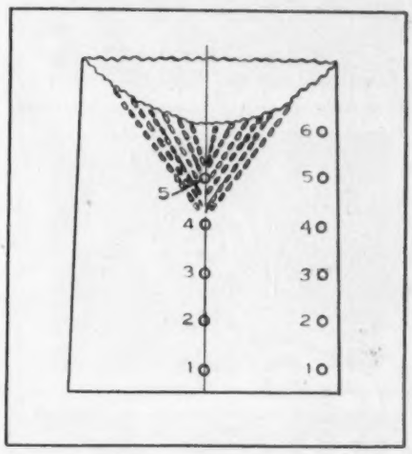


FIG. 2—CROSS-SECTION OF INGOT FROM WHICH SAMPLES WERE TAKEN.

heat in a 16-ton furnace will be described.

The furnace was charged with 7.5 tons of Swedish pig iron and 9 tons of puddled ball from Bilbao hematite. These materials are charged straight into the furnace, the first charged being the pig iron. At 9:02 a. m. the charge was commenced, and melted at 2:40 p. m. The first iron ore addition of 60 kilograms weight was made at 2:50 p. m., and another of the same weight at 3:15 p. m., followed by another of 50 kilograms at 3:35 p. m. During melting period and the following 45 minutes nearly all the silicon was oxidized. Some minutes after the third iron ore addition, the ebullition of the bath commenced, which evidently proved that the oxidation of the carbon was energetically proceeding. The iron ore additions followed from time to time as the state of the bath indicated the necessity. The operation is conducted with the air-valve closed as much as possible, so that the metal should not become cold, nor become oxidized. The total additions of iron ore amounted to 350 kilograms. At 6:25 p. m. the calorimetric analysis of the small sample taken from the bath and very slowly cooled gave a percentage of carbon of 0.52 per cent, and as the quantity required in the steel must be between 0.45 and 0.55 it was decided to tap the furnace, making previously the suitable additions of alloys. These were ferro-manganese and ferro-silicon, putting 124 kilograms of the first and 99 of the second; the percentages required in the metal were 0.55 to 0.65 per cent of manganese and 0.15 per cent of silicon. This percentage is quite sufficient for obtaining a metal totally free from side and central cavities, except those at the top of the ingot and the pipe. The metal was poured into a ladle previously well heated by producer gas. The ladle was then transported by the 50-ton electric crane to the casting pit, where the metal was poured into the mold.

The Ingot Mold

The ingot mold, both outside and inside, has the form of a truncated pyramid, Fig. 1. The sides of the inside pyramid, instead of being plane are curved surfaces joined to one another by rounding the edges. It seems natural that, since the elements of guns are cylindrical, the ingot molds should also be of cylindrical form inside, and since also the steel, as it solidifies, crystallizes in crystals whose axes are normal to the surface of the mold, the cylindrical form should be the best for obtaining good sound ingots without cracks. The reverse is what happens. The ingots cast in circular molds have always a deep longitudinal crack, and thus are incapable of subsequent forging. In order to avoid the occurrence of cracks during solidification and subsequent cooling on the outside surface of the ingots, they are sometimes cast in refractory molds. But though no cracks occur in ingots cast in such molds, the long time spent in the cooling of a large ingot, cast in such manner, produces a very coarse crystalline texture, almost impossible of being changed to the proper texture during the forging. The experience with 40-ton ingots cast in refractory molds has been totally adverse to their use as substitutes for metal molds for

the part of the ingot really utilized. When this is completely solidified and almost cold on its outside, it is taken out of the mold and is covered with ashes until it is completely cool. After this it is carefully examined for cracks, which are dealt with by the pneumatic hammer. As it is not an easy matter to get rid of them entirely by these means, the ingot is sent to the forging shop, where it is subjected to a slight preliminary forging, just sufficient to give it a cylindrical form. Any cracks not visible in the preliminary examination then appear, and are taken out in the lathe. Some very good metal is thereby lost, but in finishing the forging no cracks appear, and it is possible to finish the pieces with the least possible excess in the dimensions required for the hardening.

Before describing the forging, it may be mentioned that, about halfway through casting, operations are suspended for an instant, while a very small ingot is cast from the ladle. This is intended for the full analysis of the metal, and for forging a test-piece for a preliminary tensile test.

In order to study the segregation phenomena in the unfinished steel, the head from a 16-ton ingot was divided through its vertical axis. One of the halves of this head is represented in Fig. 2. From it were taken the samples for analyzing the carbon, manganese, phosphorus, and silicon. The samples were taken only in one-half of the head, because it was presumed that the symmetrical parts of the other half must have the same composition, as the conditions of cooling were equal for both halves. The small ingot taken during the casting operation, which, owing to its very small dimensions, is free from the phenomena of segregation, and fairly represents the composition of the steel in the ladle, gave on analysis 0.56 per cent of carbon and 0.57 per cent of manganese. On comparing these percentages with those of the samples it is observed at once that there is not a very great difference between the samples taken at the circumference of the head and those of the small ingot. But the difference is very great in the samples taken in the center of the head. Here, segregation phenomena are in evidence, especially with regard to carbon. It will be noted in the accompanying table that sample No. 1, from the bottom of the head, has the same quantitative composition as the metal of the small ingot, but in samples Nos. 2, 3, 4 and 5 the percentage of carbon increases gradually, being in sample No. 5, four times greater than in sample No 1. The manganese increases also, but less so; the silicon more than the manganese, while the phosphorus in sample No. 5 is double that of No. 1. The layer of steel, in contact with the ingot mold, represents very nearly the composition of the metal, in fact the percentage of the metalloids is less. The layer successively cooling from the outside yields to the inside layers a certain part of its metalloids, until the central part of the ingot is reached, which, being the last to solidify and cool, is therefore richer in foreign elements.

Before proceeding further, the heat treatment most appropriate for gun steel will be considered. The steel, having been cast in a mold of truncated cone shape, requires, of course, to be forged, in order to give to the gun or part of the gun the required form, which is always that of either a hollow or a solid cylinder, of varying length, with different diameters outside, and sometimes also inside. The annealing after the forging, the hardening—or hardenings, if it is necessary to harden more than once—and the subsequent tempering or temperings, constitute the series of heat treatment processes given to the steel for gun construction. Forging is not only necessary for giving the required form, but principally to change the crystalline structure of the large and medium-sized castings into one of finer grain, almost amorphous, which is essential for the best development of the physical and me-

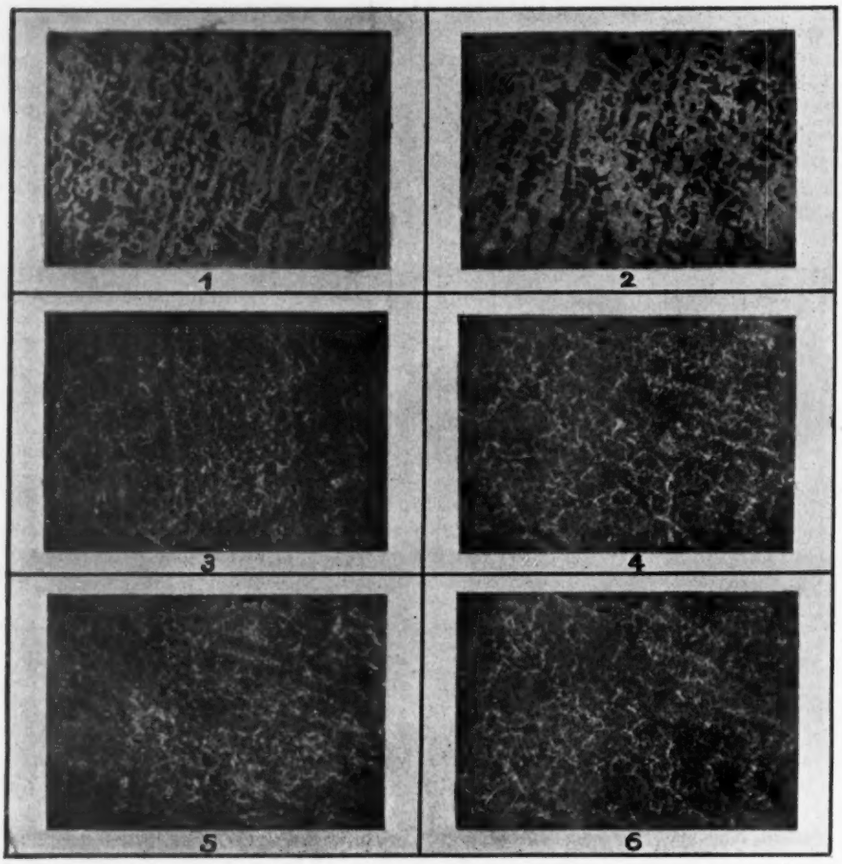


FIG. 3—PHOTO-MICROGRAPHS OF NICKEL STEEL

Nos. 1 and 2, annealed at 900 degrees Cent. after forging; Nos. 3, 4, 5 and 6, hardened at 900 degrees Cent. in water and tempered at 580 degrees Cent. Analysis: Carbon, 0.326 per cent; manganese, 0.475 per cent and nickel, 2.207 per cent. Magnified 50 diameters.

ANALYSES OF SAMPLES FROM THE INGOT.

Centre.

No.	Carbon, per cent.	Manganese, per cent.	Silicon, per cent.	Phosphorus, per cent.
1.....	0.565	0.525	0.187	0.024
2.....	0.672	0.610	0.210	0.029
3.....	1.176	0.620	0.230	0.029
4.....	1.607	0.620	0.261	0.036
5.....	2.484	0.610	0.284	0.049

Outside Surface.

No.	Carbon, per cent.	Manganese, per cent.	Silicon, per cent.	Phosphorus, per cent.
1.....	0.564	0.595	0.187	0.021
2.....	0.463	0.580	0.187	0.018
3.....	0.565	0.570	0.187	0.017
4.....	0.427	0.575	0.187	0.017
5.....	0.443	0.565	0.187	0.018
6.....	0.497	0.585	0.163	0.019

Analysis of Small Ingot Taken During Pouring.

	Per cent.
Carbon	0.562
Manganese	0.766

chanical properties of a given steel for ordnance purposes.

Coming now to the practical aspect of forging large ingots for gun construction, it must be emphasized that it is necessary to heat them very carefully and slowly. If the temperature of the furnace, when the ingots are introduced, is rather high, it is better to pre-heat them. Certainly the temperature of the furnace is suddenly lowered by the introduction of cold ingots, which naturally take a great part of the heat lost by the furnace; but this heat, taken up suddenly, causes a sudden dilatation of the outside of the ingot with the natural consequence of cracks, and it may occasion the breaking of the ingot across. This happens especially if the metal is somewhat hard. The two reheating furnaces for the great forging press at Trubia are of the Whitworth type. Their doors are worked by hydraulic power. The largest ingots, until recently forged at Trubia, were 42 tons weight, suitable for the forging of the tubes and other elements of the 24 centimeters and 45 calibers. As an instance of solid forging, that of the A tube for the 24-centimeter gun may be taken. The ingot on being taken out of the mold was 16 feet, 6 inches in total length, of which 13 feet corresponded to the pyramidal part, cast in the metal mold, and the other 3 feet, 6 inches to the conical part cast in the refractory material attachment. The diameter at the two bases of the trunco-pyramidal part was respectively 4 feet, 10 inches and 4 feet. The mean diameter of the truncated cone part was 2 feet 8 inches. The ingot free from all cracks, and reduced to a diameter of about 2 feet 8 inches by the previous forging, was put in the furnace, where it was heated carefully and very slowly during 30 hours, which is a sufficient time for the whole mass to become well and uniformly heated throughout. The temperature, as already stated, was 1,100 degrees Cent., approximately, and the forging operation is suspended at 700 degrees Cent. when the ingot is put into the furnace again. The operation was finished in three heats, and the time taken to complete it after the first heating was 15 hours. The tube weighed 18.5 tons after forging. For the hollow forged tubes and hoops, 40-ton ingots are also employed. From each ingot two B tubes are forged. The operation of removing the cracks and also of the previous forging are the same as those practiced with the ingots for the A tubes. Afterwards the blocks are delivered to a large boring machine where they are bored from both ends at the same time to a diameter of 1 foot right through. When this operation is finished, the ingot is cut into halves. The reheating is performed in the same furnace and conducted with the precautions already described in the case of the A tubes. The duration of the first heating is 30 hours, and the first operation practiced is that of enlarging the bore in a drawing press. When the operation is finished throughout the length of the tube, the latter has a larger diameter and less thickness than at the beginning of the operation. The tube then goes again to the furnace, and after careful heating the forging is continued, and it is again stretched on mandrels of different diameters. The full operation involves four reheatings, and the total duration is from 13 to 14 hours, the final dimensions of the tube being: Total length, 17 feet, 2 inches, and outside diameters 2 feet, 4 inches, in a length of about 20 inches, and of 2 feet, 3 inches in the rest of the piece. The inside diameter is 14 inches. The great hoops are forged by means similar to those employed with the B tubes. Sometimes when the ingots from which they are obtained are not very long, the hole for the mandrel is punched in the press after being carefully reheated, instead of being bored in the machine. This operation is made in one heat, the hole being driven by a conical steel tool which enlarges and lengthens the hole. When half of the ingot has been treated, it is turned and the operation repeated on the second half.

Annealing after forging is an indispensable operation in the manufacture of steel for guns. If it were possible to finish the forging of a piece in one heat only and in such a manner that the whole piece was finished at an even and correct temperature, then in this case only the annealing operation could be dispensed with. The annealing operation is conducted very carefully, the temperature in all parts of the furnace, and of the piece, being measured with a pyrometer. When furnace and piece are set at the proper uniform temperature, the gas is shut off and the piece cools slowly in the furnace. Of course the annealing temperature must be above the transformation point. The elements for field

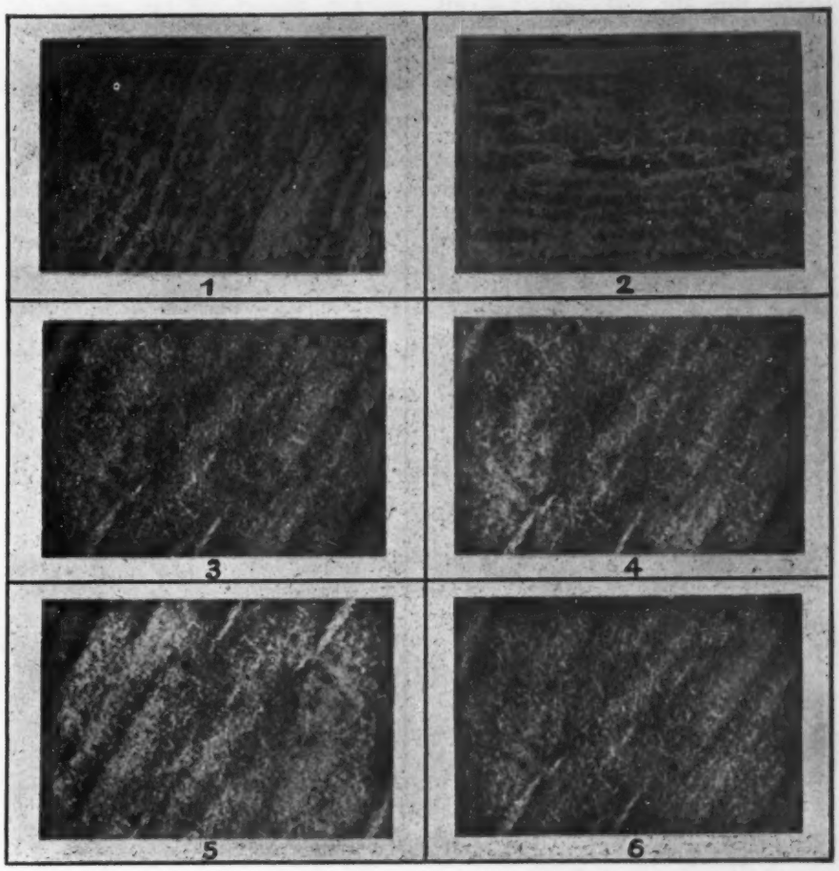


FIG. 4—PHOTO-MICROGRAPHS OF ARTILLERY STEEL

Nos. 1 and 2, annealed at 900 degrees Cent. after forging; Nos. 3, 4, 5 and 6, hardened at 850 degrees Cent. in water and tempered at 580 degrees Cent. Analysis: Carbon, 0.411 per cent and manganese, 0.47 per cent. Magnified 50 diameters.

guns are annealed in a special furnace. Taking into consideration their small mass, they are not individually annealed, but eight or ten are put into the furnace at a time. They are heated to 900 degrees Cent. very carefully, and after reaching this temperature they are slowly cooled.

At the Trubia Arsenal in Spain, in the hardening of the elements for gun construction, water is employed as the refrigerant liquid. The reheating furnaces are vertical, and are heated by gas from three producers. The large furnace is capable of taking pieces 40 feet in length, and has four inlets for the gas, regularly spaced. The second furnace is of greater diameter than the first, and its length is 26 feet. It is intended for the reheating of the B tubes and hoops, also for the tubes of the medium guns up to 6-inch caliber. The water tank is situated between the two furnaces. The water at the time of the cooling, has a temperature of 20 degrees Cent. A 35-ton overhead traveling crane is driven by a rope worked by a steam engine, and serves the whole of the hardening shop. When this plant was installed 12 years ago the intention was to use oil as a refrigerant liquid.

Use of Pyrometers

The measuring of the temperatures is done by the aid of a thermo-electric pyrometer, registering the temperature of the tube or hardened piece at different points in order to distribute the heat in such a manner that the temperature may be uniform. Undoubtedly the best method is that followed at Woolwich Arsenal, with the long tubes for the 12-inch guns of 45 and 50 calibers, where four or five pyrometers are installed, with registering apparatus, and regularly distributed all along the tube; that is both convenient and necessary when operating with tubes for guns of 54 feet in length, or perhaps more, with the excess length left at both ends for the test-pieces. It is really very difficult to heat uniformly the long pieces of variable thicknesses and therefore to harden them. The difference of operating as physical experimenters do in their laboratories with samples of some grams weight, and of dealing with 15, 20, 25 and 30-ton pieces, as is the daily practice of the manufacturers of gun steel, is enormous. By carrying out the hardening in the ordinary way, the cooling of the metal begins at the inside and outside surfaces at the same time. If the cooling is more rapid at the inside the interior layers near this surface will be compressed and the exterior layers will be in tension. The reverse will happen if the cooling is more rapid at the exterior than at the interior surface. The best condition for the resistance of guns is that the first case should occur, and then not only will the improvement in the structure derived from the hardening be obtained, but the steel will be in ideal condition for withstanding the pressure of the powder gases.

If tensions or compressions have been produced the layers of metal must be distended or compressed. Knowing the tensile characteristics of the metal, it is very easy to measure the intensity of the tensions or

A NEW SARGENT AIR METER

compressions, as they are of a purely elastic character, and it is possible to plot a diagram representing the variation of tensile strength in terms of the thickness of the piece. In the ordinary practice of conducting the hardening operation in the tubes intended for gun construction the result generally is that the outside surface is compressed, that is to say, the contrary of what must be most convenient for the strength of the gun. With hardening in water, and dealing with carbon steel of 0.5 per cent, the tempering operation is absolutely necessary. Even when the piece has been heated and hardened with absolute uniformity, and the elastic tension caused by the hardening should be the most suitable for the strength of the gun, the tempering of the piece would be absolutely necessary, because the hardness due to the hardening would make it very difficult, if not impossible, to machine the piece in ordinary conditions of work, and the tensile, bending, and dynamical properties would not be in accordance with the specifications. In hardening in oil, in nearly all cases, tempering at a very low temperature in order to cause the disappearance of the light stresses originated, is sufficient, but in water hardening, and with metals 0.5 per cent of carbon, the tempering temperature will be near that of the transformation point.

Ordinarily that necessary for obtaining the best tensile properties is about 600 degrees Cent. It is clear that if these properties, after the heat treatment, are deficient from those specified, or lower than those required, it would be necessary to submit the piece to fresh heat treatment, raising the temperature of hardening and keeping constant that of tempering, or the same result can be obtained by giving the piece a new hardening at the same temperature and lowering that of tempering. If, on the contrary, the tenacity were higher and the ductility less than required, the results can be rectified by giving the piece a new tempering at a higher temperature.

A New Air Meter

To obtain closer readings and consequently more accurate determination in the measurement of air or gas, a Pitot meter, shown in the accompanying illustration, has been designed by the Sargent Steam Meter Co., Chicago. It can be attached to any pipe from ½ inch upwards, and on account of its light weight it can be used as a portable or permanent meter. It consists of a brass tube or well, around the circumference of which is spun a semi-circular groove in which is wound a transparent celluloid tube, the lower end of which connects with the well and the upper with a passage through the yoke and cock to the tube in the pipe whose opening is perpendicular to the flow of gas or air. The well is connected by a similar opening through the yoke and cock to the Pitot tube having one or more openings facing the flow of the air or gas. Water or oil is placed in the well through an opening made for the purpose until it reaches a zero mark on the helix.

When the cock handle is vertical the space above the fluid in the well and

above the fluid in the helix are both open to the atmosphere, and if the fluid is at zero under these conditions, accurate results will be obtained. By turning the cock handle 90 degrees, as shown in the illustration, the well is connected with the air or gas pipe through the Pitot tube and the space in the helix is connected to the same pipe through the straight tube. If there is no velocity to the air or gas in the pipe, the liquid in the helix will remain at zero, irrespective of the pressure. In other words, the statical head does not change with the pressure where the Pitot tubes terminate.

The pressure in the Pitot tube when the air or gas flows through the pipe is transmitted to the well, and the liquid in the helix rises in proportion to the velocity of the air or gas. For every

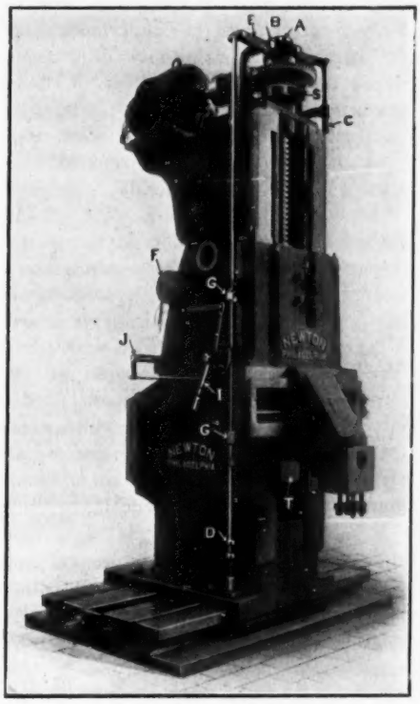


FIG. 1—NEWTON PORTABLE SLOTTING MACHINE

inch of vertical rise the liquid travels about 10 inches around the well, and as this distance is graduated in 100 parts, the head can be read to 1/100 of an inch. Consequently, the actual velocity of the air or gas is readily determined. The well and helix are revolvable on the yoke so that the head of liquid in the helix can always be read, yet the connection to the pipe is not broken. Any error caused by evaporation or condensation is readily detected by turning the cock handle for an instant to a vertical position, when the liquid in helix should return to zero if conditions have not changed. As the helical tube is made of transparent celluloid it cannot break. Meters are tested to 100 inches working pressure.

Newton Portable Slotting Machine

A portable slotting machine driven by a Westinghouse reversing motor and built especially for the Canadian works of the Westinghouse Electric & Mfg. Co., is shown in the accompanying illustrations. The drive from the 10-horsepower reversing planer motor operating at speeds ranging from 200 to 1,000 revolutions per minute, is transmitted through a coupling to the bronze pinion meshing with a large steel bevel gear which is mounted on and revolves freely around the elevating screws. This gear has an outside diameter of 19 inches. When the slotting machine is in operation the clutch, *A*, Fig. 1, mounted at the upper end of the screw, is always engaged with the driving bevel gear, while the lever engaging and disengaging this clutch is pivoted at *B*. In the event of the failure of any part of the apparatus, including the trips for the reverse, the saddle on the up-stroke strikes the rod, *C*, thereby disengaging the clutch tooth, while on the down-stroke the saddle strikes the rod, *D*, which is supported by springs at the bottom and is coupled to the clutch rod, *E*, at the top of the machine.

The master switch which controls the length of the stroke is located at *F*. It can be operated either by hand or by the adjustable trips, *G*, at the side of the saddle. Hand operation from either side is provided by hand lever, *I*, Fig. 1, and lever, *K*, Fig. 2. These levers are connected by a shaft, *J*, Fig. 1. The auto-starter and relay coils are mounted on a slate panel on the back of the frame in a convenient position for inspection.

The saddle has a bearing on the face of the upright, 30 inches wide and a full bearing 56 inches long on each of the shears which are 8 inches wide. The alignment is controlled by square locks and the saddle is held to the frame by bolted gibs. Adjustable taper shoes are provided for taking up side wear and for obtaining accurate adjustment. The tool saddle carries a relief tool apron which is steel-faced and is equipped with clamping studs and swinging clamps. Reversing, angular and in-and-out feeds are provided in addition to the reversing cross feed of the tool holder saddle on the main saddle. The power cross feed to the saddle is 48 inches long and if greater length of the traverse is required for occasional work, the upright is adjusted by hand on the base and the power feed then is utilized. The feed can be reversed by placing the change gear, *L*, Fig. 2, on the shafts, *M* and *N*. The arm, *O*, engages the adjustable stop, *P*, on the downward stroke, and is thus lifted in position for the upward stroke when feeding takes place. The dog, *R*, engages arm, *O*, to operate the feed. The elevating screw is 4½ inches in diameter and has a coarse pitch, square thread. To carry the weight a roller bearing is placed at *S*, Fig. 1, which resembles an oil pan, insuring the thorough lubrication of the bearing.

The bottom of the screw also is provided with roller thrust bearings which rotate in the oil pan, *T*, Fig. 1. The upright has square locked gibs on the base, and the upright traverse by hand is 48 inches. The saddle also is counterweighted, the counterweight being located for convenience inside of the upright. Th machine complete weighs 23,000 pounds.

This particular tool was arranged for a cutting speed on the downward stroke

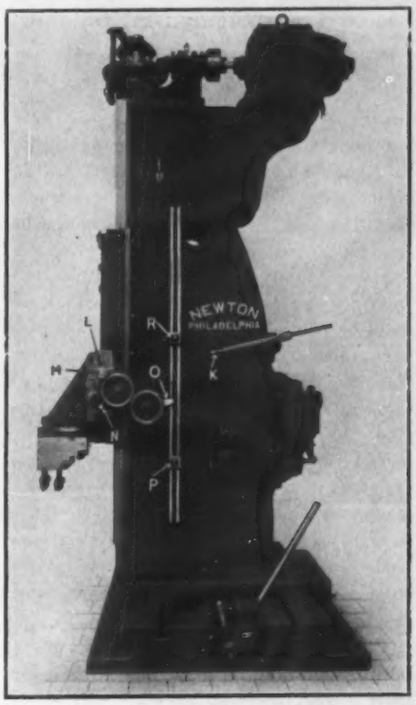


FIG. 2 — SIDE VIEW OF NEWTON PORTABLE SLOTTING MACHINE

ranging from 20 to 37½ feet per minute with a quick return of from 42½ to 75 feet. The traverse of the saddle in either direction can be immediately stopped by the switch. This portable slotting machine was built by the Newton Machine Tool Works, Inc., Philadelphia.

Two motor trucks, built by the Kissel Motor Car Co., Hartford, Wis., during the month of July, covered 886 miles, hauled 192 tons and consumed only 254 gallons of gasoline and 21 gallons of oil. This is considered an excellent showing, particularly in view of the fact that more than 70 per cent of the roads traversed were up-grade.

STORAGE BATTERY TRUCK HAULING TRAIN OF CARS FOR THE DELIVERY OF SUPPLIES TO STOCK STORAGE

Storage Battery Trucks for Transporting Material

The plant of the Jeffrey Mfg. Co., Columbus, O., covers an area of approximately 26 acres and has 18 acres of floor space. This plant manufactures a large and varied line of electrical locomotives, electric storage battery trucks, coal mining, elevating and conveying machinery of all descriptions, etc.

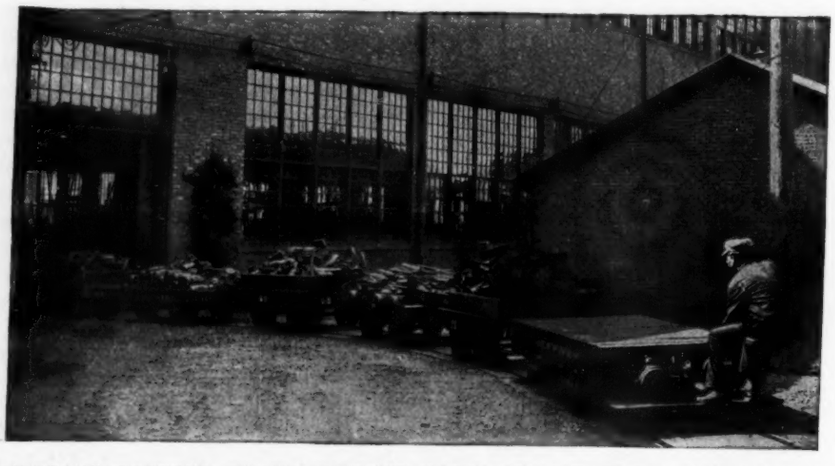
Throughout the shops of this company a high degree of efficiency has obtained for some time, but the matter of transportation of raw and finished material did not receive adequate consideration until a few years ago. Up to that time the raw and finished material was being transported to and from cars and in and about the various shops and departments by two-wheel warehouse trucks, four-wheel trucks and industrial cars. Also, part of the territory was served by a Jeffrey storage battery truck working on a 36-inch gage industrial track. A careful study of existing conditions made plain the fact that a very material saving could be effected by establishing a more efficient transportation system.

After considering the problem from every angle, it was decided that the storage battery truck and industrial cars offered the best and most efficient means of surface transportation. Accordingly, the industrial railway was extended to take in all departments and a systematic method of car dispatching was adopted.

As soon as this system was established, very rigid instructions were issued that absolutely no material was to be transported by other means than by the storage battery trucks and industrial cars. It was immediately found possible to dispense with the services of a two-horse team, 28 two-wheel warehouse trucks, 13 four-wheel trucks, 8 wheelbarrows and 18 men whose whole time had been devoted to this purpose. This effected a saving of more than $600 per month over the cost of the former system, taking into consideration the interest and depreciation on the investment, operation, maintenance, etc. The material handled monthly aggregates approximately 4,000 tons.

While hauling requirements of industrial plants vary with the character and arrangement of each and with the class and quantity of material handled, in a majority of cases the conditions are favorable for the use of storage battery trucks. The flexibility of the track system gives wide range of operation by permitting the truck to run over tracks in and out of buildings and from place to place wherever its services are required. The truck can haul material on its platform or on separate trucks as a trailing load.

These trucks can be equipped with Edison, Exide or other types of storage batteries. The battery will operate from one to two days on a single charge, depending upon the amount and severity of the service. The trucks are built in two sizes with platforms 42 x 120 inches and 54 x 120 inches for gages of track 18 to 30 inches and 30½ to 42 inches, respectively. The truck frame is structural steel, the platform is made of heavy oak and the truck has a carrying capacity of 5 tons. The minimum radius of curves over which the truck can travel is 12 feet and the speed, 250 to 300 feet per minute.



STORAGE BATTERY TRUCK HAULING TRAIN LOADED WITH CASTINGS AT THE PLANT OF THE JEFFREY MFG. CO.

First Aid to the Injured

Investigations which have been made of accidents in industrial establishments indicate that many serious injuries would have been classified among minor accidents, provided first aid could have been administered by a skilled attendant. On the other hand, many cases of minor accidents assume major proportions when the injured fails to obtain the services of a physician and endeavors to treat the injury himself. Fully appreciating the importance and the necessity of a hospital department where all injuries, regardless of their character, can receive prompt attention, the Erie Malleable Iron Co., Erie, Pa., has equipped a surgical room at its plant which is modernly equipped throughout. It is in charge of a graduate physician who remains at the works throughout the day. The employes are required to report to this department all injuries, regardless of their gravity, and if only minor, the injured receives attention at the plant at the hands of this physician. On the other hand, if the injury is of a nature which will compel the injured to remain at home he is visited by the physician and attention is given until the wound is healed.

In cases of major accidents only first aid is rendered and the injured is immediately sent to a hospital. Exceedingly good results have followed the establishment of this department, and the employes, receiving this treatment free of cost, call upon the services of the plant physician for all minor injuries which heretofore they have endeavored

to care for themselves, frequently with serious results.

A blank containing a history of each accident is carefully filled out by the plant physician. On this is entered the name, age, address, occupation and nationality of the injured, together with his religion and whether he is married or single. A careful record is maintained of when and where the accident happened and the names of witnesses of the accident also are entered on this report. On the reverse side of this blank are front and back views of the human form, with a skeleton in outline, on which is marked the exact location of the injury. In addition, the plant physician describes fully how the accident happened. This record, in the event of a claim for damages, is of great value as it contains all of the necessary data covering the case.

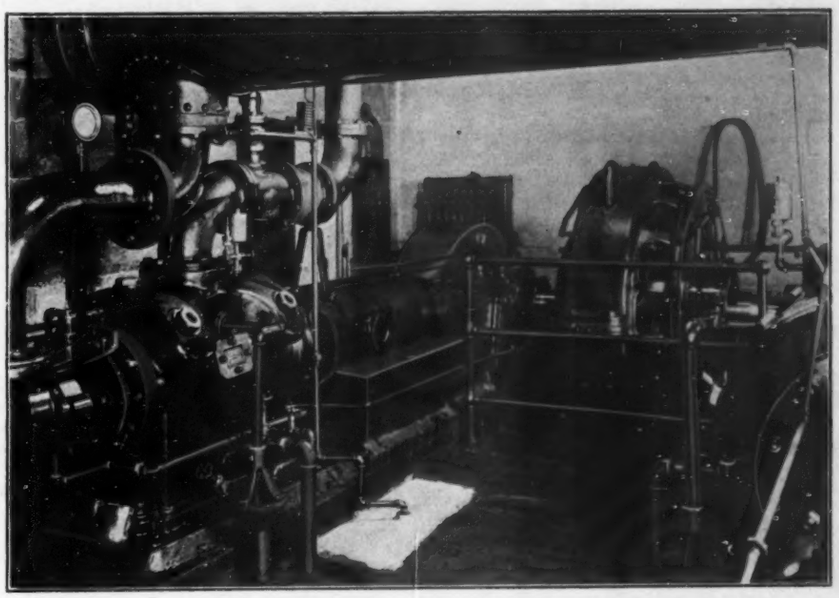
Waste Steam Drives Motors

At the plant of the Indiana Steel & Wire Co., Muncie, Ind., two 22 x 42-inch Corliss non-condensing engines operate a series of wire drawing benches. These engines receive steam at a pressure of 100 pounds from a battery of boilers consisting of four 150 and three 125-horsepower units. Each engine carries a load averaging 370 to 400 horsepower and operates continuously with the exception of Sundays and holidays. Sixty-cycle, 220-volt motors are employed to drive the machines which fabricate the wire into wire fencing, wire nails, etc. The electric power for the operation of these motors was formerly purchased from an outside source, but early in 1910, it was decided to utilize the exhaust steam from the Corliss engines to generate this electric power and to save the constant expense of purchased power.

A 600-kilowatt mixed pressure Curtis turbine was installed and the exhausts of the two Corliss engines were conducted to a common header from which the turbine derives its steam at a pressure of 1 pound gage. The turbine exhausts into a Wheeler condenser which maintains a vacuum of 28 inches. In case the engines are shut down, the mixed pressure turbine is not affected, as it automatically cuts in sufficient high pressure steam to meet its power requirements. The turbine now carries the entire motor load of 600 horsepower, using steam that was formerly allowed to go to waste, and this economy has been effected without increasing the size of the engine room, the numbers of boilers, or the number of operators about the plant.

An Electrically-Driven Air Compressor

In the accompanying illustration is shown a motor-driven air compressor unit installed in the Park works of the Crucible Steel Co. of America, located at Pittsburgh. The compressor was built by the Ingersoll-Rand Co., and is what is known as the two-stage medium duty type. The low pressure air cylinder is 20¼ inches in diameter, and the high pressure cylinder has a diameter of 12¼ inches, the stroke being 18 inches. Running at the rated speed of 180 revolutions per minute, it gives a piston displacement of 1,117 cubic feet per minute. The air is compressed to 100 pounds per square inch at which pressure it is maintained automatically by the governor located on the air intake pipe of the low pressure cylinder. The air is taken from the compressor to a large iron receiver outside the compressor room, from which it is piped to different parts of the works for performing various functions, principally in operating pneumatic tools.



MOTOR-DRIVEN AIR COMPRESSOR UNIT AT THE PARK PLANT OF THE CRUCIBLE STEEL CO. OF AMERICA

The motor driving this compressor was manufactured by the Westinghouse Electric & Mfg. Co., and has a capacity of 210 horsepower at 200 revolutions per minute. It is mounted between the high and low pressure sides of the compressor and is designed for operation on direct current circuits at 220 volts. It is of the constant speed type, compound wound, and is equipped with commutating poles. The frame is cast steel and the air spaces are provided in the windings. The motor is controlled by a multiple switch starter mounted on a slate panel. It can be stopped instantly by a push button, which opens the automatic switch or circuit-breaker on the panel. The outfit operates 24 hours a day with the excepion of the time between the shifts which is taken for cleaning and inspection.

The commutating poles insure a sparkless commutation at all loads with the brushes remaining at one position. Due to the open type of construction employed, excellent ventilation is assured and air is permitted to reach the windings. The direct-connected compressor results in the saving of power due to the elimination of intermediary transmission.

Metal Tile Roofing

The Berger Mfg. Co., Canton, O., is now manufacturing a new type of weather-proof metal tile for roofing purposes. The water guard of the tile is high and the joints are absolutely tight with ample provision for expansion and contraction under all climatic conditions. The shape of the tile permits of the free circulation of air underneath the metal tile roof which insures dry roof sheathing and the air space under the tile serves as a conductor of heat and cold.

"Technical Graduates Versus Foundry Foremen and Superintendents" is the title of an eight-page booklet published by McLain's System, Goldsmith building, Milwaukee. The position of the college graduate in the foundry is contrasted with that of a foundryman trained by the McLain system.

Reviews of Catalogs and other Trade Publications

AIR COMPRESSORS.—In a 24-page booklet, the Pennsylvania Pneumatic Co., Erie, Pa., illustrates and describes the Barr, unit compound air compressor. Various types of machines are shown including the single steam-driven, single belt-driven, twin belt-driven and single motor-driven.

POWER PUMPS.—A 48-page catalog, issued by the Dean Bros. Steam Pump Works, Indianapolis, is devoted to its extensive line of power pumps, including the duplex double-acting power hydraulic pump, duplex outside end packed plunger pump of the valve pot pattern, duplex outside center packed plunger pump, electrically-driven valve plate and cover pattern pump, double-acting outside center packed plunger pump arranged with suction valves, electrically-driven duplex piston pumps, double-acting power hydraulic pressure pumps, etc. A line of air compressors also is shown.

GRAB BUCKET CRANES. — A 24-page catalog, issued by the Sprague Electric Works of the General Electric Co., New York City, is devoted to grab bucket cranes of various types. Illustrations are included, showing the method of unloading coal at a power house with a grab bucket mono-rail crane, the use of a mono-rail crane in a boiler room, handling coal from storage, unloading ore from a vessel, etc. The crane dimensions are given on line drawings and views of the motors, controllers and other crane equipment also are included.

DIRECT CURRENT RAILWAYS.—Direct-current railways of 1,200, 1,500 and 2,400-volts form the subject of a 129-page catalog, issued recently by the General Electric Co. The book is profusely illustrated and well-arranged. Comprehensive notes are given on the operation and equipment of many railways in the United States, accompanied by tables giving details of power and operating costs. Other General Electric bulletins deal with electric drives in grain elevators and flour mills, irrigation with electrically-driven pumps and the use of electricity in the brewing industry. All these bulletins are well illustrated.

DERRICKS AND DERRICK ENGINES.—An exceedingly interesting 78-page catalog, published by the Lidgerwood Mfg. Co., New York City, is devoted to the extensive line of derricks and hoisting engines built by this company. The application of various types of derricks is illustrated and details of derrick fittings are included. A large number of different types of hoisting engines are shown, as well as grab buckets, portable warehouse cranes, excavators, etc. The rapid unloaders built by the Lidgerwood company are illustrated in another 16-page catalog, which shows the use of these unloaders for discharging dirt, ballast, rock and ore.

POSITIVE PRESSURE BLOWERS. — Air pumps, exhausters, vacuum pumps, air compressors and air tanks are illustrated and described in a catalog issued by the Albert J. Kelting Engineering Works, Brooklyn, New York City. The positive pressure blower made by this concern is adapted for blower work where a pressure of not more than 10 pounds per square inch is required. The blower consists essentially of two parts, the shell and the blast wheel. The latter has a recess on each side in which two impeller blades oscillate upon a specially-designed trunnion bearing made to take up wear, thereby keeping the blade and bearing in proper alignment. This also insures the proper contact between the edge of the blades and the shell. Both belt and motor-driven units are manufactured.

HACK SAWS.—The extensive line of hack saws and frames manufactured by the L. S. Starrett Co., Athol, Mass., is illustrated and described in a 32-page booklet recently issued. Saws are shown having 32 teeth per inch for cutting tubing and thin sheet metal, especially brass and copper. Heavier and larger saws with 12 teeth per inch are used for heavy work in power machines and numerous saws between these limits are included. For a wide range of work, and which can be used to cut anything from a steel beam to a small tube, a hack saw is made by the Starrett company which has 18 teeth per inch and in lengths from 6 to 12 inches. While this saw is not as fast cutting as one especially designed for a given job, nevertheless it is exceedingly serviceable. It is made of special steel and is set to clear easily.

TURBINE PUMPS.—High duty turbine pumps built by the Lea Equipment Co., Philadelphia, are illustrated and described in a 16-page bulletin, issued by this company. The top and bottom section or casings of this pump each consist of a solid casting, while the suction head is built up of two small castings. By merely lifting the upper section of the pump all working parts are exposed for inspection or adjustment. The impellers are of cast iron or bronze, as the working conditions may require, and great care is exercised to balance them properly. Grooved wearing rings, fitted to the impellers come in close contact with the finished interior of the pump casing so that leakage from one stage to the next is prevented. These pumps are built in a range of capacities adapted for the usual classes of service for which the turbine pumps are suitable. Four standard sizes of fire pumps also are built for supplying from two to six 1⅛-inch streams.

MECHANICAL DRAFT. — The subject of mechanical draft, both forced and induced, by blowers and exhaust fans, is discussed in a well-illustrated, 64-page publication issued by the American Blower Co., Detroit. The purpose of this booklet is to call attention to the natural advantages readily realized with artificial draft produced by mechanical means and the illustrations included have been selected from a large number of photographs of actual installations. A number of valuable tables are published, such as the cost of coal for steam power, horsepower of a leather belt 1 inch wide, loss of air pressure in ounces per square inch for varying velocities and varying diameters per 100 feet of pipe, pressure in inches of water, pressure in ounces per square inch, properties of saturated steam, volume and density of air at various temperatures, etc. The American Blower Co. also has issued three bulletins, devoted, respectively, to cast iron blowers and exhaust fans, high pressure exhaust fans and unit heaters.

SWITCHBOARD METERS.—In a 44-page catalog, issued by the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., switchboard indicating meters are discussed under four headings as follows: "Modern tendencies in design," "Advantages of Induction Meters," "Westinghouse High Grade Meters and the Theory of Induction Meters." Paul MacGahan discusses modern tendencies in the design of switchboard indicating meters and directs attention to the new problems with regard to the equipment of switchboards arising from the increasing size of power plants and the concentration of generating and controlling equipment into small spaces. The catalog contains a large number of illustrations with interesting data on the theory and performance of induction instruments. The Westinghouse Electric company has issued a series of descriptive leaflets illustrating the new line of switchboard indicating meters. On each leaflet is a full size fac-simile of the meter dial, the purpose being to present a correct idea of the actual appearance of the meter when installed. Leaflets also have been issued showing synchronous booster rotary converters, commutating pole direct current motors and rules for the selection of machine tool motors.

COLD SAW CUTTING-OFF MACHINES. —The extensive line of cold saw cutting-off machines built by the Newton Tool Works, Inc., Philadelphia, is described in a well-arranged and well-illustrated 112-page catalog, recently issued. The entire subject of cutting metal cold is discussed at length, and a brief historical sketch is included covering the development of cold saw cutting-off machines. Before the Newton company built its first machine only six of these tools were in use in this country and these were of English manufacture. The first Newton machine was built in 1889 for the Midvale Steel Co., and the second machine, shipped shortly after the Midvale order, is still in operation in Philadelphia. These metal sawing machines are essentially milling machines operating a slitting cutter of large diameter and all the usual practice in the operation of milling machines, it is stated, should be observed in the operation of cold saws. For material high in carbon and manganese or un-annealed stock, the speed should be low and the feed should be increased. This applies particularly to cutting-off gates or risers on steel castings. Suggestions are included with reference to the cutting compound to be used and the care of saw blades also is outlined. The many different types of machines built are illustrated and described in detail, and these include machines for cutting steel bars, I-beams, girder rails, internal cold saw cutting-off machines, combination machines, milling machines, portable slotting machines, rotary planing machines, gear cutting machines, crank shaft cold saw cutting-off machines, as well as an extensive line of machines for use in steel foundries for cutting off gates, risers, etc. This company also shows a special machine for cutting armor plate, as well as an automatic saw sharpening machine. To assist the company in checking its mailing list a post card is being forwarded with this catalog on which the number of copies desired is to be entered and spaces are provided for entering the name and proper address of the party to whom future printed matter should be sent. A line is provided also for the names of those who are to be removed from the mailing list. The card is unusually simple but complete, and should prove of value for checking mailing lists generally.

BIG SHIPS

Have Altered Lake Business—Conditions Improving.

The big ship, so-called, made its appearance in the great lakes trade in 1904, entirely revolutionizing the business, and, it may be added, demoralizing it as well for the time being by over production. However, lake trade conditions appear now to be on the mend. Herewith are given tables showing the movement of bulk freight (iron ore, coal and grain) on the great lakes during the past seven years, together with the bulk freighters available to carry the freight.

Table I.

Year.	Launchings.	Subtractions.
1905	29	33
1906	40	18
1907	40	16
1908	24	4
1909	17	5
1910	20	17
1911	5	8
	175	101

Table I shows the additions and subtractions that have been made during the past seven years in the bulk freight-carrying fleet. The launchings given are those of bulk freighters only; the list of subtractions include those of bulk freighters only. The figures show that during the past seven years 175 bulk freighters have been added to the available fleet and 101 removed.

An impartial analysis of the figures leaves a rather favorable impression. It looks as if the trade would speedily absorb the tonnage available to carry it. During 1905, a

Table II.

Bulk Freight Movement.

Year.	Iron ore gross tons.	Total including ore, coal and grain.
1905	33,475,904	59,410,086
1906	37,513,589	67,696,897
1907	41,290,709	76,349,896
1908	25,427,094	55,175,585
1909	41,683,599	73,558,471
1910	42,618,758	81,427,406
1911	32,130,411	70,428,392

total of 59,410,086 net tons of freight was moved, and there were available to move it 518 bulk freighters of 1,919,285 gross tons carrying capacity. Thirty cargoes are probably a high average for the season, and if all these bulk freighters had carried 30 cargoes they would have moved 57,578,550 gross tons during that year. Of course, the bulk freighters did not move all of this bulk freight, because the package freighters and lumber carriers undoubtedly made some inroad into the coal and grain trade; nor did all the bulk freighters make 30 trips. Accidents and unforeseen circumstances must have delayed a portion of them. During 1910 a total of 81,427,406 net tons of freight was moved and there were available on Jan. 1, 1910, bulk freighters to the number of 589, of 2,973,447 gross tons, to move it. These vessels could have moved, in 30 cargoes out,

Table III.

Carrying Capacity of Bulk Freighters.

Year.	No. of vessels Jan. 1.	Tonnage of same gross tons.
1905	518	1,919,285
1906	514	2,065,111
1907	542	2,442 754
1908	567	2,766,781
1909	587	2.853,344
1910	589	2,973,447
1911	592	3,108,333
1912	589	3,135,953

89,203,410 gross tons. This, of course, is tonnage capacity considerably in excess of freight offering, but the lake trade has been known to fluctuate 10,000,000 tons in a single season.

MALLEABLE PLANT

Will be Sold to a Syndicate—Oliphant Family Retires.

The Trenton Malleable Iron Co., Trenton, N. J., which was organized about 20 years or more ago, has completed arrangement for the selling of its plant to a syndicate composed of John H. Murray, Frank J. Eppelle, H. Arthur Smith, James Dayton, Harry B. Lapp, A. A. Shumann, Robert Chamberlain, William Shute and Lloyd Grover. The syndicate will operate the plant under its old name, the new officers being the following: President, John H. Murray; vice president, James Dayton; treasurer, H. Arthur Smith; secretary and general manager, Frank J. Eppelle. The officers and the other members of the syndicate compose the new board of directors. The new owners plan to improve the plant considerably, but have formed no definite plans as yet. The Trenton Malleable Iron Co. was owned and operated by the Oliphant family, which for many years was prominently identified with the iron and steel industry in Trenton. It owned the Oliphant Steel & Iron Co., the Trenton Malleable Iron Co., the New England Steel Castings Co., and had heavy interests in other concerns. The Trenton Malleable Iron property was the last of these to remain in its possession and this sale marks the final withdrawal of the family from the iron industry in Trenton.

BATTLESHIP FOR GREECE

Will Have Armor Plate and Armament Made by Bethlehem Steel Co.

The Bethlehem Steel Co. has just been officially notified that it has been awarded the contract for the armor plate, armament and ammunition for a battleship for Greece. This award is a great testimonial to the excellence of American armor plate and ordnance, since it was taken in competition with English, German and French manufacturers of this material. The ship is of 14,000 tons displacement. The hull and machinery will be built in the yards of the Vulcan Ship Building Co., Stettin, Germany. The material which the Bethlehem company will furnish, will, after completion, be forwarded to the Vulcan yards for installation on the ship.

The Bethlehem company's contract covers upwards of 3,000 tons of armor plate, and the battery consists of six 14-inch guns, eight 6-inch guns, eight 3-inch guns, and 26 guns of smaller calibers than 3-inch. The value of Bethlehem's portion of the contract is upwards of $3,000,000, and all of the material will have to be complete in the early months of 1914.

The Bethlehem Steel Co. is rapidly increasing its foreign business, having at present in an advanced stage of completion, a large contract for the armor, armanent and ammunition for two dreadnaughts, of 26,000 tons displacement each, for the Argentine Republic. The company expects to supply the Argentine government with a number of spare guns, intended for these vessels, as well as additional ammunition. It has in an advanced state of completion, a contract for armor plate for the Italian government, and expects to be awarded the contract for a number of large caliber guns, for the coast defense system of Chile. The company also has excellent prospects at present for orders from other foreign governments.

The untiring energy which is being displayed by the state department of the United States in the interest of American manufacturers has contributed to the success which the Bethlehem company has encountered in its foreign business.

To Elect Trustee.—Creditors of the Southern Iron & Steel Co. will hold a meeting on Sept. 4 for the election of a trustee in bankruptcy. Holders of first and refunding bonds, 6 per cent one year gold bonds and 6 per cent gold debentures have until Sept. 3 to deposit such securities with the Bankers' Trust Co., New York.

THE IRON TRADE REVIEW

DEVOTED TO THE IRON, STEEL, MACHINERY AND FOUNDRY INDUSTRIES

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Increasing Cuban Ore Development

All indications point to the increasing importance of the island of Cuba as a source of iron ore supply for the eastern iron and steel industry. The island is now, and has been for some years, the principal source external to this country from which iron ore supplies have been drawn. This movement has been on an increasing scale in recent years and since 1909 has been running well over 1,000,000 tons annually.

The shipments from Cuban properties during the past four years, all of which has been consumed by eastern furnaces, were as follows: 1911, 1,162,787 tons; 1910, 1,429,349 tons; 1909, 968,858 tons; 1908, 538,862 tons.

The state of trade conditions in the iron and steel industry is clearly reflected in these figures. From the poor year of 1908, the shipments ascended to the record high point in 1910, when the industry enjoyed a limited period of prosperous conditions. In 1911, the imports again fell in response to the reduced operations in the east and elsewhere, but under the present active revival of trade, they are again on the rise and a heavy year's record for 1912 is now indicated. The practically full furnace operations at present at Sparrows Point, Steelton and South Bethlehem suggest a heavy movement of this ore over the remaining months of the year, since the largest Cuban operations are controlled by the Pennsylvania Steel Co., with its companion company, the Maryland Steel Co., and by the Bethlehem Steel Co.

An interesting development in the Cuban ore situation this year is the offering and absorption in the east of a comparatively large tonnage of merchant ore from that country. More than 200,000 tons of Cuban ore have been purchased by eastern merchant furnaces for delivery during the current year. This is the heaviest movement in merchant ore from Cuba that has yet taken place. The offering of this ore follows from the enlarged operations and productiveness of the properties controlled by the two leading steel-making owners. Hitherto, a good portion of the ore that is now being offered to eastern merchant iron makers was absorbed by one of these steel-making consumers. The increased shipments from the north coast or Mayari deposits are supplying one of these concerns, the Pennsylvania Steel Co., with an enlarged output of high grade mineral and this has contributed to the offering by this company this year in the open eastern market of some tonnage of south coast ores.

The proximity of their location and the high grade analysis of the deposits, together with the reduced duty, give Cuban ore important advantages as a source of supply for eastern merchant furnaces, should the controlling companies decide to offer this material freely on the market. The extent of the Cuban deposits, which is reasonably defined to be very great, suggests the strong probability of some extended operations in the future with the eastern ore market in prospective.

If it should be decided to extend the present scope of development of Cuban properties to embrace its market opportunities, which the size of the deposits makes not unlikely, this condition may go a long way towards solving for eastern merchant furnaces their present problem of maintaining a dependable source of ore supply, free of many of the uncertainties of the present foreign ore traffic, particularly that from trans-Atlantic countries. The geographical position of the Island of Cuba and the character and extent of the ore deposits give it a commanding technical position in the eastern market that may be more fully put to profit as the years advance and the eastern iron and steel industry expands.

Facts and Folderol of the Steel Debate

Chairman Stanley, of the Steel Corporation investigating committee, had considerable difficulty in getting the controlling powers of the house to allot him time for discussion of the five reports submitted by members of his committee. It was finally decided to allow two evenings for the discussion. Evening sessions ordinarily are devoted to eulogies of departed statesmen. Whether, for this reason, it was considered appropriate to consider the conclusions and passing of the late committee at night sessions, we do not know, but some of the remarks made by congressmen were so ludicrous as to be more appropriate for a lively wake than for an ordinary funeral occasion. Stanley himself ascended to the greatest heights of demagogic oratory. The special object of his abuse was Mr. Perkins and newspapers have given wide publicity to the attack in which Mr. Stanley talked about the "vale of tears", "the young mother wrapped in the black habiliments of woe, prostrate upon the new made grave of her once loving lord", "orphans wailing the name of father above the silent dead", the "pinched fingers of helpless childhood", "the loathesome annals of greed and graft" and other things. This sort of ranting may be popular with Kentucky audiences, but will not greatly impress intelligent people. Some of Mr. Stanley's distortions of facts are more likely to deceive the public than is his diatribe on Mr. Perkins. Nothing that he does should, however, be taken very seriously.

To the Hon. Daniel J. McGillicuddy, of Maine, was allotted a part of the precious time of the two evenings set aside for the discussion of the committee's reports. Some of the alleged information brought out through colloquies with other members is indeed il-

luminating. For instance, the Hon. Rufus Hardy, of Corsicana, Texas, arose to inquire:

> Is it not altogether possible that the Steel Trust would not permit of the existence of these alleged independent companies if they were not taking toll from them by way of high prices for their raw material and for their railway freights and in a way making them subordinate to and subservient to the Steel Trust itself?

To this question the Hon. Mr. McGillicuddy replied:

> Mr. Speaker, I am glad to hear the gentleman ask the question, because it shows he has been looking into the proposition and understands it intelligently; and that is precisely the fact.

Mr. McGillicuddy, having spent many months investigating the Steel Corporation, is able to detect real information and his commendation of Mr. Hardy came with the promptness of one who knew a man of real intelligence. But he was not satisfied by paying the compliment to his colleague. Mr. Hardy remarked, by way of supplementary information, "In other words, they are simply working for the Steel Trust," and thereupon the Hon. Mr. Gillicuddy made a statement which will be indeed interesting to the independents—poor slaves who know not their master—and to those who own or use iron ore. Said Mr. McGillicuddy:

> They are working for that Corporation, because they cannot do anything else. They would like to, but they cannot. When the United States Steel Corporation absorbed the Tennessee Coal & Iron Co., thereby getting control of the iron ore in this country, they controlled not only this country, but they proposed to control the world. That is what you will hear next. That will be the next move.

If, as the honorable congressman from Maine asserts, the Steel Corporation was about to add the whole world to its possessions and has not yet done so, its halting is clearly due to the fact that the Corporation was investigated by Mr. Stanley and his associates. Mr. McGillicuddy tells us how he got his eyes opened to the political truth, and how the rest of the people in Maine did and for the first time in 53 years sent a Democrat to congress from the district which he has the honor to represent. "You cannot," he exclaims, "fool the people any more." No, indeed, the people of Maine certainly ought not to be so unappreciative as to fail to recognize the merits of a man who took even a slight part in stopping the gobbling of the globe by a trust.

Some of the members of congress stick more closely to the truth than does the chairman of the committee. For instance, Mr. Jackson, an insurgent from Kansas, said in his speech, "We are a long ways from the millennium on this trust question yet, almost as far, I believe, as before the committee was appointed, and that is no criticism upon the committee." In proof of his assertion, the Hon. Mr. Jackson calls attention to the headlines of newspapers of more than 20 years ago and recently published in book form by Prof. R. T. Ely. Here is the way the headlines read:

> *Black eye for the trusts—Important decision handed down in Chicago.*
>
> *The Standard Oil Trust has resolved upon dissolution.*
>
> *Pools are hit hard—United States Supreme Court upholds Sherman Act—Decision is a surprise—Virtually declares all traffic agreements illegal—Competition will be open—Managers greatly concerned.*
>
> *Trusts in a panic—Tobacco combine makes the first important surrender, etc.*

One of the interesting features of Mr. Jackson's speech was his reference to the speech of acceptance of Gov. Wilson, whose very moderate utterances are, he says, made "while Brother Stanley is charging the octopi in all their various lairs on the theory of dissolution and assumed prosecution, and we, his colleagues, are shouting our applause and crying, 'On, Stanley, on!'"

All of the discussion was not, however, as flippant or ludicrous as the above quotations from the speeches of Messrs. Stanley, McGillicuddy and Jackson. Mr. Sterling, of Illinois, who made one of the minority reports, delivered a very thoughtful speech of which perhaps the strongest part was his argument against fixing of prices by the government. He called attention to the attempt made in the fourteenth century, in England, to protect the people from extortions of monopoly by fixing prices by law. These laws were found impracticable and uninforceable and gradually fell into disuse. They were repealed from time to time, the last being stricken from the laws of England as late as 1856. Mr. Sterling said in part:

> Parliament fixed the price at which the baker should sell his bread and the butcher his meat. It fixed the price of clothing and many of the common necessities. Then it followed, as a necessary and logical sequence, that it should fix the price of labor which produced these things. This did not take into account the fact that the habits and needs of men are different, and so parliament sought to regulate the habits and appetites of men by passing a statute determining just what a laboring man and his family should eat and wear.

Mr. Davis, of West Virginia, interrupted to call attention to a similar failure in price fixing during the French revolution. Mr. Sterling added:

> Those who espouse the doctrine of government recognition of trusts and monopolies agree that it inevitably follows that government shall fix the price of their products. This will be necessary in order to protect the public from extortion. But where will this lead us? If we fix the price of the product, must we not also fix the price of the raw material and of the labor that converts it? If we fix the price of labor, it follows that we must protect the laborer by fixing the price of those things that sustain labor, such as food, clothing, and shelter.

The advocates of price fixing by the government may well turn their attention to careful study of the attempts of the past referred to by Mr. Davis and Mr. Sterling. With the exception of the speech of Mr. Sterling, there is very little worth reading in the debate, which occupied six hours in the house of representatives. It is unfortunate that the consideration of such a great question as the regulation or dissolution of monopolies was left to be taken up at the close of a long session of congress, when the members were weary, and when, owing to the pendency of a presidential campaign, it was impossible to have a calm, thoughtful and thorough discussion.

MEN OF THE IRON TRADE

W. H. Crouse, of the Pullman Car Co., has been transferred from Dayton, O., to Cincinnati.

L. R. Lemoine, president of the United States Cast Iron Pipe & Foundry Co., will sail on a European tour on Aug. 24.

Alexander P. Robinson was elected a director of the Cambria Steel Co. at the recent annual meeting to succeed Frederick Krebs, resigned.

James W. Rickey, hydraulic engineer for the Aluminum Co. of America, has moved his offices from Massena, N. Y., to 2402 Oliver building, Pittsburgh.

Julius Loeb, of the American Metal Co., 52 Broadway, N. Y., is spending his vacation in Europe. He will return to this country during the early part of September.

F. Ringer, assistant chief engineer of the Missouri, Kansas & Texas railway, has been appointed engineer of maintenance of way, with headquarters at Parsons, Kan.

L. H. Guerin and Samuel Young have formed the firm of Guerin & Young for the general practice of engineering, with offices at 1002 Perrin building, New Orleans.

C. H. Dana, assistant engineer of the Gulf, Colorado & Santa Fe railway, with headquarters at Galveston, Tex., has been appointed chief engineer of the Union Terminal Co., Dallas, Tex.

William A. Hunicke will engage in private engineering practice, with offices at 302 Florida Life building, Jacksonville, Fla. He has been construction engineer of the Cuban Central railways.

Edward Gray, who has been engineer of maintenance of way of the Southern railway, at St. Louis, has become associated with the Jones-Gray Railroad Construction Co., Louisville, Ky.

Norman Russell, who has been eastern sales manager of the United States Cast Iron Pipe & Foundry Co., at Philadelphia, has been made purchasing agent with headquarters at Burlington, N. J.

C. M. Pond will have charge of the branch office of the Pratt & Whitney Co., Hartford, Conn., which will be opened at 336 Fourth avenue, Cincinnati, O. Mr. Pond will also have charge of the Cleveland branch.

H. F. Wardwell, who has been assistant manager of the Central Locomotive & Car Works, Chicago, has opened an office in the Railway Exchange building, Chicago. He will engage in a railway equipment business.

A. R. Brown has resigned his position as special agent in charge of the rescue station work of the United States bureau of mines, and accepted the assistant superintendency of the second division of mines of the Tennessee Coal, Iron & Railroad Co.

Otis L. Jones, formerly superintendent of the American Refractories Co., at Joliet, Ill., has recently organized and is manager of the Illinois Clay Products Co., which is now completing a large fire clay grinding and shipping plant at Oglesby, Ill.

I. M. SCOTT,

President of La Belle Iron Works, Who Will Be Identified With the New Wheeling Sheet & Tin Plate Co.

Fred W. Bruning, chief engineer of the Niles Tool Works, Hamilton, O., who retired a short time ago, has returned to work at the request of President James K. Cullen, of that company. Mr. Bruning is 68 years old, and has been with the Niles company 40 years.

L. F. Ostrander was elected president of the Continental Radiator & Foundry Co., St. Louis, at the recent meeting of the board of directors. Other officers chosen were: Vice president, T. C. Skeen; treasurer, Benjamin G. Crosby; secretary, John J. Ostrander.

W. C. McMahon, for five and a half years president of the Belle City Malleable Iron Co., Racine, Wis., has tendered his resignation to take effect Sept. 15. Mr. McMahon becomes on that date vice president of the Northwestern Malleable Iron Co., of Milwaukee.

Horace Carpenter, who has been mechanical engineer for the board of water supply of New York City for the past five years, in charge of the design and construction of power plants and water-controlling apparatus, has resigned to become general manager of the Coffin Valve Co., Boston, Mass.

Samuel Hale, at present vice president and general manager of the Wisconsin Steel Co., has been appointed general manager of the Algoma Steel Corporation, Sault Ste. Marie, Ont. He will assume his duties about Oct. 1. Mr. Hale is 43 years of age and was born in Chicago. He started in the steel business in 1893, with the Illinois Steel Co., of which concern he became assistant general superintendent in 1899. Subsequently he became connected with the International Harvester Co., and when the steel properties of that company were organized into the Wisconsin Steel Co., Mr. Hale was made vice president in charge of operations, a position he has successfully filled for about ten years.

Harry S. Willard Sr. has been elected president of the Wellston Steel & Iron Co., Wellston, O., following the resignation from that office of Eugene L. Zimmerman, Cincinnati. Mr. Zimmerman succeeded to the presidency upon the death of M. L. Sternberger a short time ago, but has disposed of his holdings in the company. The purchasers are Maurice L. Sternberger Jr., Jackson, O., and Harry S. Willard Sr. Mr. Sternberger has been vice president and general manager of the company and will continue in those capacities. Mr. Willard, who has been actively associated with the iron and steel business for 40 years, will take a leave of absence, owing to failing health, and will spend several months at Bay View, Mich. H. S. Willard Jr. was elected treasurer of the new organization.

THE AUTOBIOGRAPHY OF JOHN FRITZ

It is singularly fitting that a tribute should be paid to John Fritz on the occasion of his 90th birthday. He was 90 years old yesterday, Aug. 21.

If there ever lived a man whose life was an example to younger men, that man is John Fritz. The name is synonymous with unremitting effort and patient labor. Whatever John Fritz did he did with all his might. The debt the iron trade owes to him is immeasurable and his name will always remain one of the foremost, if not the very foremost, in the history of the American iron trade.

His autobiography recently published is infinitely more entertaining than any work of fiction and no one can read it without being the better for having done so.

John Fritz was born on a farm and lived the life of a farmer's boy until he was 16 years of age. His schooling was exceedingly meager—only a few months being devoted to it each winter, but he appreciated what he got and speaks well of his teachers. He became an apprentice to learn the trade of blacksmithing and country machine work at the age of 16 years. He possessed a natural love of mechanics, but he early determined to learn all that there was to be known about the iron and steel business. He really had nothing to unlearn and his mind, like Bessemer's, was therefore unfettered in its attack upon the problems that presented themselves.

His mind was highly original and he was instinctively thinking continuously of new ways in which to do old things. His eagerness to learn and his desire to exploit his own talents took him from plant to plant and no sooner had he exhausted all there was to know in one plant than he went to another and it is sufficient commentary to say that his resignations were not only received with regret, but were invariably most violently opposed by his various employers.

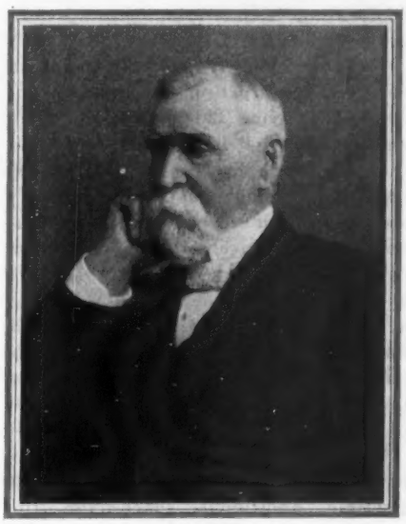
Any employer could account himself rich to have such an employe as John Fritz.

The chapters devoted to Cambria are very instructive and it is clear that Cambria was the apple of John Fritz's eye. He was not satisfied that Cambria should turn out steel equal to that of any other plant, but that it should turn out better steel and make a standard for the world and in this he admirably succeeded.

John Fritz devoted himself to Cambria days and nights and Sundays and one would be sure to find him somewhere about the works. For many years he never took a day or an evening or a Sunday off. His devotion to his work was absolutely his ruling passion.

When John Fritz believed himself to be right, nothing could shake that belief. When he decided to scrap one machine to install another, yet untried, but which he believed to be more efficient, nothing could stop him. With the whole operating force in open hostility, he could not be swerved from his course. He was probably a source of great trial at times to his directors, especially in the dark days when money was scarce and business uncertain.

It was a great struggle to make



JOHN FRITZ,

Grand Old Man of Iron Trade, Who Celebrated His Ninetieth Birthday Aug. 21.

Cambria a financial success and there were more times than one when it was on the verge of bankruptcy.

He relates this incident:—

"At the time when we were in the midst of our improvements at Cambria, a banker to whom the company owed $20,000 came into the rolling mill and asked me what we were doing. I told him that we were making changes and improvements. His reply was that any man who would destroy property and spend money as we were doing was a fool or a mad-man. I told him that I was doing it and it never had occurred to me that I was either. He took the train that night for Philadelphia, and the next morning called up the company's office and demanded his money in such an emphatic manner that they had to pay him that day."

One has to read between the lines here and the directors probably wished that Fritz had been a little more diplomatic, but it is clear that that thought never occurred to Fritz himself. He knew that he was right and that he was doing the proper thing, even if no one else could see it.

In one portion of his autobigraphy he says:

"I laid down an absolute rule to not even suggest anything new or untried until I had satisfied myself that it was all right and was the proper thing to do and consequently I was well fortified and was in a position that was at all times impregnable."

The impression that one gets from reading the life of John Fritz is that of unselfish devotion to duty. His work came before all things else; his mind was constantly upon it and was forever seeking efficiency. No man under him or over him worked half as hard. He possessed a physical and mental equipment that is given to few men. He was energetic, tireless, courageous, firm, yet gentle. He was a real master of men and could straighten out tangles in a plant quicker and smoother than anyone else.

No one can read this work without getting some inspiration from it, and it should be one of the prized possessions in the library of every engineer. No engineering library is complete without it, for it is a document in real life that hasn't its counterpart anywhere.

It has been impossible to avoid writing this review in the past tense, for while John Fritz is with us yet, his life work is over. He is sitting in the shadows looking back, but it is safe to say that no man now living can look back upon so much. He saw the beginnings of the American iron and steel industry and he has been part and parcel of its astounding development, being more intimately associated with it along purely creative lines than any other man.

It was a stupendous career of human effort that he looked back upon yesterday from the great height of 90 years.

The Autobiography of John Fritz, 6 x 9 inches, 327 pages, 21 illustrations. John Wiley & Sons, New York City. For sale by the Penton Publishing Co., $2.00.

STEEL BILL

Defeated in Senate After Being Passed by House.

Washington, Aug. 20.—The steel tariff schedule, which was passed by the house over President Taft's veto, was decisively defeated in the senate. Instead of the two-thirds required, the measure failed to obtain a majority and was voted down 39 to 32. The vote in the house was 173 to 83.

In a message to congress, accompanying his veto of the bill, President Taft said he disapproved of the measure because it provided for "revenue only" and took no account of protection for American industries. Because it refused public hearings on the bill, the president arraigned the ways and means committee of the house.

Another reason the president gave for his veto was that the bill affected, not only the iron and steel industry, but 59 allied industries, which, he said, are worthy of separate classification. He explained that he was not prepared to say there were no items in the steel schedule which might not well be reduced, but he pointed out that its ad valorem rate of duty was an apparent reduction of 15 per cent from the duties of the Wilson law.

"A bill for a complete revision of this schedule was presented to me a year ago in the extra session of this congress," wrote the president. "Many increases and decreases of rates are now made from those named in the former measure. The changes are not explained and indicate the hasty method pursued in the preparation of both. Is it not fair to ask, either on the basis of protection or revenue, which was right?

"On the whole, therefore, I am not willing to approve of legislation of this kind, which vitally affects not only millions of workingmen and the families dependent on them, but hundreds of millions of dollars' worth of stocks of goods in the hands of store-keepers and distributors generally, without first providing for a careful and disinterested inquiry into the conditions of the whole industry.

"From the outset of my administration, I have urged a revision of the tariff based on a non-partisan study of the facts. I have provided the means for securing such information in the appointment of a tariff board. Their thorough work, already completed on several schedules, has justified my confidence in this method. The principle is endorsed by chambers of commerce and boards of trade in almost every city of importance in the country. The proposed bill has not been framed on the basis of any such study of the industry.

"Avowedly, its rates are fixed with no consideration of anything but revenue. The principle of protection is disregarded entirely, and, therefore, it is not too much to say that the effect of these sweeping changes on the welfare of those engaged in these varied industries has been disregarded."

ROLL FOUNDRY

At East Chicago is Rapidly Nearing Completion.

The new addition to the plant of the Hubbard Steel Foundry Co., at East Chicago, Ind., is rapidly nearing completion. This comprises a complete roll foundry and finishing department, which will be the first plant of its kind west of the Pittsburgh district. The company has booked so many advance orders for rolls that it feels that its judgment in locating such a plant has already been vindicated.

The new addition to the plant is of steel construction throughout, occupying a space 180 x 165 feet. The roll foundry is 165 x 120 feet, and the finishing department 165 x 60 feet. The foundry is equipped with two 20-ton air furnaces, a 3-ton cupola, drying ovens, 40 and 20-ton overhead traveling cranes together with all other modern equipment for a plant of this character. For the finishing of the rolls, roll grinding machinery will be used instead of the older method employed in most of the shops of the east.

The removal of the finishing department to the new addition makes possible additional space for the steel foundry, giving it a floor space approximately 420 x 190 feet, and a capacity of 1,000 tons per month.

Opposed Steel Bill

A committee of machine tool manufacturers from Cincinnati was sent to Washington, on Aug. 16, following the passage of the steel tariff bill by the house, over President Taft's veto. The committee consisted of J. D. Doan, vice president of the American Tool Works Co.; P. G. March, president of the Cincinnati Shaper Co., and the Cincinnati Gear Cutting Machine Co.; and C. Wood Walter, vice president of the Cincinnati Milling Machine Co. They held a conference with Senator Burton of Ohio, and Senator Cummins of Iowa, immediately upon their arrival at the capitol.

BETHLEHEM EXTENSIONS

Will Include Six Open Hearths For Shape and Rail Tonnage.

The Bethlehem Steel Co. has commenced work on an extension of its Saucon open hearth plant, which will be 157 x 720 feet, and will include the erection of six additional open hearth furnaces, each of 75 tons capacity, and of the most modern type of construction. The capacity of the plant after the six furnaces are completed will be 16 open hearth furnaces, with an output of 75,000 tons of ingots per month. In addition to the six new furnaces, considerable additions are involved by the extension in the way of steel buildings, hot metal mixers, the installation of large electric cranes, and other appurtenances. The location of these furnaces is such that a large excavation will be necessary, representing 160,000 cubic yards of rock and earth, and the contract for this work has already been let to F. H. Clement & Co.

The extension will be in an eastwardly direction, adjoining the present plant. All of the capacity of these furnaces will be put into Bethlehem and standard open hearth structural steel shapes and open hearth rails. The extension has been made necessary by the constantly increasing demand for Bethlehem structural shapes, standard structural material and high grade open hearth rails. The cost of this extension will represent an expenditure of considerably over $1,000,000.

The drop forging business of the company has also increased to the extent that it has been found necessary to provide additional buildings, and other facilities in the way of machinery, for increasing the output of the department. The extensions to this department will consist of a new warehouse for storing the drop forged material, and a treating and finishing department, representing an expenditure of $100,000.

Work has also been begun by Contractor Robert S. Rathbun on the addition to the general office building, and on the new armor plate office. The Ochs Construction Co. is the contractor for the latter.

The large gas holder now being constructed for the storage of coke oven gas, which is to be used in the various departments of the Bethlehem Steel Co., is rapidly nearing completion. This holder will have a capacity of 1,000,000 cubic feet. The gas is carried from the holder to the Saucon plant of the company in gas mains 36 inches in diameter, the laying of which has about been completed.

STANLEY'S ASSUMPTION

Shown to be False—Iron Ore Conditions Discussed.

In the first article of a series on "Iron Ore Reserves" in the *Engineering Magazine* for August, Edwin C. Eckel, for years connected with the United States geological survey, discusses certain phases of the iron ore reserve problem in both its industrial and political relations. In his introduction, he calls attention to the investigations recently made both by a congressional committee and by the bureau of corporations. In the course of his statement, Mr. Eckel takes issue with the reports arising out of both these investigations. He says in part:

"It is notable that during some of the recent discussions of the steel industry, there became evident a curious misconception of the relations which have normally existed in the past between iron ore mines and blast furnaces. The chairman of the Stanley committee, for example, frequently framed questions on the obvious assumption that ownership of mines by furnace interests dated back only to the advent of the large steel combinations—say to 1900 or thereabout. It was evidently taken for granted by Mr. Stanley, as well as by some of his associates on the committee, that during all the earlier periods of the history of the American iron industry, furnace owners ordinarily bought their ore from an entirely independent set of mine owners. This erroneous assumption, unimportant in itself because it relates to a matter of purely historic interest, becomes of great importance as the argument is followed out, for it is used as a basis for conclusions of immediate and serious import. Assuming that ore ownership by furnace interests is a recent development in the industry, the conclusion drawn is that such ownership, in its present stage, is a step in the direction of final ore monopoly.

Were Never Separated

"As a matter of historic fact, the assumption that mine and furnace have normally been separate enterprises could hardly be further from the truth. During all of the earlier periods of American iron history, the furnace owned and operated the mine, and was ordinarily located near it. In the south, east and west this business relation between the two has persisted uninterruptedly until the present day, so that over the greater portion of the United States merchant ore mines have never been of great importance. The Champlain and imported ores hardly qualify this statement.

"In the Lake Superior district, however, there was a relatively short period when the independent ore mine was the most important factor in the industry. This condition arose gradually, was due to peculiar local conditions, and seems to be passing. Since the conditions which caused it have disappeared, the merchant mine is apparently on the way to becoming as scarce in the lake region as it has always been elsewhere in the country."

Ore Reserves

Taking up the discussion of reserve ownership, Mr. Eckel says:

"It is to be noted that the minimum ore reserve which a steel-manufacturing company can safely carry is determined, and determined within rather close limits, by the amount of its investment in manufacturing plant and other fixed property. It would be obviously injudicious to risk a heavy investment which might be made entirely valueless within a few years by a shortage in ore supply. To be in a sound financial position, a steel company must therefore own sufficient ore to justify the erection of a steel plant of commercially competitive size, and to guarantee that this plant will be able to remain in operation on a competitve basis for a long period of years.

"The accompanying table presents specific data relative to some points which have just been discussed in a general way. In it will be found the total reserve-ore tonnage of a number of typical American iron and steel companies, and the present annual rate of ore consumption of these same companies.

"With regard to the sources of the data used, it may be said that the annual consumption given is either the exact or the approximate tonnage taken out during 1910, a record-breaking year as far as ore shipments were concerned. The reserve tonnages for the Steel Corporation in the Lake district are based on those reported by the Minnesota and Michigan tax commissions; while its Alabama reserve (400,000,000 tons) is taken from reports by a number of engineers. The Republic reserves are quoted from annual reports of that company; and the Sloss figure from an appraisal report. The Pennsylvania and Bethlehem data are from semi-official notices regarding the Cuban lands of the two companies. The Woodward figure is submitted by the present writer, and is close enough for our present use. Taken as a whole, these estimates of reserve tonnage may be accepted as being fair, impartial, and as accurate as possible.

"The companies whose chief holdings are in the Lake Superior district have really rather scanty reserves there. They would probably be glad to increase their holdings, but present prices for Lake ores in the ground are high, and the carrying charges would be heavy. The companies which have secured reserves in the south or in Cuba, where ore lands are still incomparably cheaper than in the Lake region, are subject to lighter carrying charges, and can therefore take on far heavier reserves without entering upon policies of doubtful economy."

ORE HOLDINGS AND CONSUMPTION OF STEEL COMPANIES

Company—Ore district.	Tonnage owned.	Present annual draft.	Duration of supply.
United States Steel Corporation, Lake district	900,000,000	21,000,000	43 years
United States Steel Corporation, Lake and Alabama	1,330 000,000	23,000,000	55 years
Pennsylvania Steel Co. Cuba alone	600,000,000	934,092	642 years
Republic Iron & Steel Co., Alabama	89,000,000	700,003	127 years
Republic Iron & Steel Co., Lake and Alabama	128 000,000	2,000,300	64 years
Bethlehem Steel Co., Cuba alone	250,000,000	318,814	783 years
Sloss-Sheffield Co., Alabama	78,000,000	800,000	95 years
Woodward Iron Co., Alabama red ores	235,000,000	500,000	450 years

The World's Production of Pig Iron

Messrs. James Watson & Co., of Glasgow, Middlesbrough, Liverpool and Swansea, have issued their annual statistics of the world's production of pig iron. The figures cover the year 1911, the years 1909 and 1910 being included for purposes of comparison. They are as follows:

	1911. Tons.	1910. Tons.
United States	23,649,344	27,298,545
Germany	15,535,112	14,793,325
Great Britain	9,718,638	10,216,745
France	4,508,022	4,032,459
Russia	3,521,000	2,956,000
Austria and Hungary	2,089,867	1,990,684
Belgium	2,072,843	1,803,500
Sweden	633,800	634,300
Spain	435,000	425,000
Canada	824,345	740,210
Italy	253,322	343,600
Japan	162,000	162,000
India	49,183	35,933
China	110,000	120,000
Mexico	70,096	45,000
New South Wales	36,354	40,487
	63,668,926	65,607,788

The total for 1911 shows a decrease of 1,938,862 tons as compared with 1910, but an increase of 3,303,146 tons as compared with 1909.

WORKING CAPITAL

Needed by Radiator Company Provided by Plan of Reorganization.

A plan of reorganization for the McCrum-Howell Co., manufacturer of radiators, boilers and vacuum cleaners, which is now in the hands of a receiver, has been worked out by the creditors' committee and announcement is now being made to the stockholders.

The condition of the company was found to be distressing, but the reports of the engineers and others disclosed that the business has an earning capacity. The plan provides for new capital. A new corporation will be formed with an authorized capital of $1,600,000 preferred and $3,000,000 common stock; $875,000 of the preferred stock will be sold for cash to provide working capital.

The creditors will receive 25 per cent of the amount of their claims in preferred stock and 75 per cent of the claims in common stock. The total amount of the debt of the company is about $2,600,000. Creditors and stockholders will be offered the first opportunity to purchase the new preferred stock in proportion to the amounts of their claims and present holdings of stock. The new preferred stock to be sold will carry with it a bonus of common stock of the new company.

The report that some criminal proceedings might be the outcome of the failure of this company, is touched upon in a statement given out by Edward R. Stettinius, at New York, who is quoted on the subject as follows:

"The receivers have not been advised that any criminal action has been commenced, but such action would, of course, not be within their province; their duty being simply to conduct the business and preserve the assets under the direction of the court."

It is understood that both the receivers and the creditors are sanguine that a reorganized company under new management will be successful.

Barnet & McQueen, of Minneapolis, have obtained the contract from the Canadian government for building a proposed elevator at Port Arthur, Ont., the contract price being $1,179,500. There were four Canadian bidders, but the figure of the American company was lower by $335,000 than the lowest Canadian tender and the time for completing the work several months earlier. The elevator, which will be owned by the government, will have a capacity for 3,250,000 bushels and is to be completed by Sept. 15, 1913.

STOPS SALE

Of Plant of St. Louis Blast Furnace Co.

A federal injunction obtained by the Whitney-Kammerer Co. prevented the sale of the plant of the St. Louis Blast Furnace Co. at auction at the court house door in St. Louis, last Friday.

The St. Louis Union Trust Co., trustee for creditors, has been advertising the plant for sale for a month. The Whitney-Kammerer Co., which owns $4,000 of a $200,000 bond issue, secured a deed of trust on the plant, and had obtained a judgment against the blast furnace company for $4,000, secured an injunction from Judge Trieber of the United States district court at St. Louis, July 23, preventing the sale.

A dozen or more pig iron men were on hand to watch developments, and a Cincinnati syndicate had a representative present presumably to bid on the property. Isaac H. Orr, trust officer for the St. Louis Union Trust Co., announced when the injunction was read, that he would not have allowed the property to be advertised if he had not been led to believe the injunction would be abandoned.

The plant has been shut down for quite a while. It is located in South St. Louis, and at one time was a money-maker.

Shows Surplus

Chicago, Aug. 20.—For the first time in many months Allis-Chalmers Co., in June, earned a surplus over expenses and depreciation. The surplus for the month amounted to $25,000, after a depreciation charge of about $34,000 had been written off. This is considered an exceptional accomplishment, especially as the company is in the hands of the receiver. In the early part of July orders fell off, but have shown improvement in August.

Girod Electric Furnace.—The Bethlehem Steel Co., South Bethlehem, Pa., has decided to install the Girod electric furnace which will enable it to produce a much larger quantity of special steel. The Girod furnace has given unusually good results in the manufacture of large heats of the better grade steels. The first Girod installation by the Bethlehem company will have a capacity of 10 tons per heat.

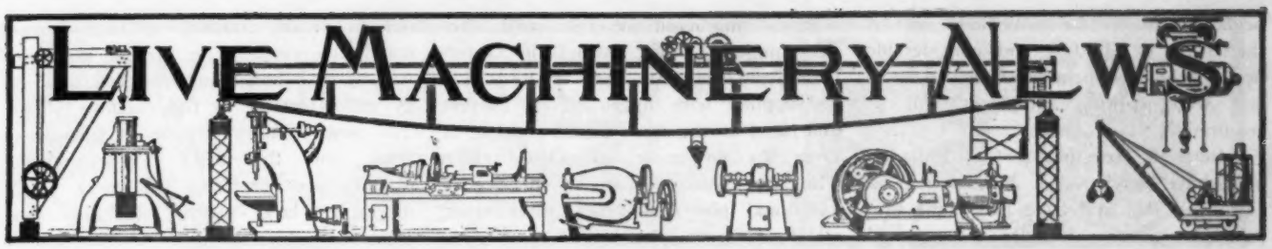
MARKET IS EXCITED

British Pig Iron Higher and Stocks Decline.

Office of THE IRON TRADE REVIEW,
Princes Chambers, Corporation St.,
Birmingham, Eng., Aug. 10.

Pig Iron.—The market this week has had a period of excitement and buoyancy, notwithstanding the holidays. Buying at Cleveland has gone on practically without interruption. On Wednesday, there was a sale of 28,000 tons, and prices mounted up 9d in a few hours. The selling figure is now 60s 9d ($14.86) with 61s ($14.94) for one month and 61s 6d ($15.96) for three months. The Middlesboro stocks are reducing at about 1,000 tons per day, and at this rate they will soon disappear. The pressure for iron is largely due to the demand of those consumers who had confidently looked for a reaction and had run their stocks quite out. They were therefore ready to purchase anywhere, at almost any price. The consumption is beyond all precedent, and the demand for iron is expected to increase. Warrant stocks are vanishing at an increasing pace, the amount in store falling, during July, from 312,000 tons to 290,000 tons. It is quite five years since the iron trade had anything like this experience. Production would be greatly increased, but for the scarcity of coke, which is selling at extraordinary prices.

Finished Material.—For holiday week, the finished iron and steel trade has passed through a remarkable experience. On Monday, the marked bar houses advanced their prices to £9 10s, a rise of 10s per ton. This was exactly what was expected, the makers having made the date of the advance coincide with the rise in the men's wages. The unmarked bars are comparatively steady in price just now, sales being generally on the basis of £8 5s per ton. As the ironmasters are having to pay 9d per ton more for puddling, they are certain to recoup themselves shortly at the expense of the consumer. There is some surprise that galvanized sheets are lagging behind in price, in view of the very cheerful reports from America, and the very large exports shown in the board of trade returns for July. The wire trade is having a great run of business, with very good prospects. The structural department is increasing its demands every week, through so many new buildings and extensions being required. The shipbuilders also are very good customers, although recent advances have enormously added to the cost of building ships.



Machine tool dealers are enjoying the heaviest volume of business in five years. The present month is expected to show the largest aggregate of business transacted in any month since the panic of 1907. The increase is general, affecting practically all dealers, and extending to all lines of the industry. The most notable feature of the revival of business is the renewed activity shown by the railroads. The Pennsylvania railroad has issued a list, aggregating close to $250,000, for the Ft. Wayne division of the lines west. Other railroads having specifications before the trade are the Michigan Central, Virginian, Oregon Short Line, Chesapeake & Ohio, Rock Island, St. Paul, Wabash, Chicago & Alton and the Burlington. The B. & O. is preparing a requisition. Dealers say that railroads have put off buying new equipment until now they are forced to buy in order to make needed repairs. The middle west is having the heaviest machine tool business in its history. Large extensions to industrial plants are being made as a result.

In the New York market, the demand for machinery this week has not been so active as during the preceding week, according to some dealers, but this is ascribed to the vacation period and not to any change in conditions. The National Sugar Refining Co., Long Island City, has purchased a motor-driven lathe and a motor-driven drill press. Cornell university has purchased two lathes. A large New England automobile maker has also bought some machinery in New York. The list of the Baron de Hirsch Trade school, published in THE IRON TRADE REVIEW *last week, still remains unclosed. The Norfolk & Western railroad sent out an inquiry on Saturday for four large machines, bids to close Aug. 20. The demand for automatic turret lathes is very heavy, some makers being booked ahead until January. Milling machine makers are also having trouble in making deliveries as a result of the large volume of orders. The huge list of specifications issued recently by the Lima Locomotive Corporation has been distributed. A large portion of this machinery will be furnished by Manning, Maxwell & Moore, Inc. The largest list now out is that of the Pennsylvania railroad, bids on which will close on Aug. 23. The heavy demand for machinery from Canadian car building plants is without precedent. The Eastern Car Co., which is locating a new plant at New Glasgow, N. S., is coming into the market for its requirements, having already ordered five electric traveling cranes. The National Steel Car Co.'s list is still pending.*

In Pittsburgh, machine tool dealers report that more orders are being booked this month than in either June or July. There has been a good demand for all types of machines, and inquiries are coming out at a much better rate than was the case several weeks ago. Considerable interest is being taken in the list recently issued by the Pennsylvania railroad. This is the first railroad list to come into this district for some time. Demand for rolling mill machinery continues fairly heavy. Although prices are somewhat better than were obtainable last month, there is still some complaint on the part of machine tool builders.

In Chicago, the western railroads are again showing considerable interest in the machine tool market, and a number of lists are pending in Chicago. The Wabash, Chicago & Alton and the Burlington are negotiating with the trade. General sales recently have been very satisfactory and there is a large demand for power plant equipment.

In Cleveland, the machine tool business is showing steady improvement. Dealers universally report a satisfactory volume of business and indications are that August will show a heavier movement of machine tools than any month for several years. The revival is apparent in all lines and is marked by a flood of small-sized orders that aggregate considerable volume. The Pennsylvania railroad has issued a list of specifications, which will aggregate close to $250,000, and is the largest requisition issued by any railroad for several years. It is for the Pennsylvania, Ft. Wayne & Chicago division of the lines west, and includes all lines of equipment from heavy cranes to small air tools.

In Cincinnati, the machinery market is gradually improving. The demand for wood-working machinery has increased lately, and more business is being done in that line at present than for some time. Foreign orders are still being received in larger numbers than domestic orders, the call being mostly for lathes, grinders and drills. The demand for small electrical machinery, while still good from foreign quarters, is increasing locally. There is a slight improvement in the selling of second-hand machinery. Railroads are not buying as heavily as expected, judging from the fact that some of them have good-sized lists in the market. Planers have also increased in demand, and milling machines have been good sellers for some time.

Machine Tools

The Stacey Manufacturing Co., Cincinnati, manufacturer of iron and steel specialties, has increased its capital stock from $150,000 to $750,000.

The Smedley Steam Pump Co., Dubuque, Ia., is in the market for elevator and conveying machinery, including one 30-foot steel bucket elevator; 160 8 x 5 x 5-inch and 330 12 x 6 x 6-inch malleable iron buckets.

The Bridgeport Screw Co., Bridgeport, Conn., is planning to install equipment for the manufacture of machine screw products. The company at present produces only wood screws. The manufacture of machine screws will be carried on temporarily in a frame structure, 26 x 126 feet. Another building will be erected later on for making machine screws.

Bids for the reconstruction of the buildings of the Barnard & Leas factory, Moline, Ill., were opened recently. The three main structures to be erected are the machine shop, wood shop and

heating plant. The estimated cost of the work is $100,000 and considerable new machinery, including machine tools and wood-working equipment will be required.

Schutte & Koerting & Co., Philadelphia, have purchased a 20-acre tract at Cornwell, Pa., and have had plans prepared for a brass foundry and car and testing station. Charles A. Blatchley, Philadelphia, is the engineer.

The Draper Co., Hopedale, Mass., manufacturer of textile machinery, has commenced work on the construction of two four-story additions, 140 x 160 feet and 50 x 90 feet. The former will be used as an erecting shop.

The De Laval Steam Turbine Co., Trenton, N. J., rearranged and remodeled its entire plant recently. It has built a new turbine pump testing department, an erecting shop and a storeroom, and recently finished a new two-story office building, 25 x 150 feet, the old office space now being given over to machinery. Machines to the number of 35 have been added to the old equipment. The company is now letting contracts for a new power house and equipment to replace the existing power plant.

Power Plant Equipment

The McCray Refrigerator Co., Kendallville, Ind., will construct a power plant in connection with its factory at an estimated cost of $50,000.

The Middle West Utilities Co., Chicago, is arranging to acquire the municipal electric light plant at Midway, Ky. The new owners plan to enlarge the plant considerably and install new machinery.

We are advised by R. W. Hemphill, city clerk, Norton, Kans., that preliminary arrangements have been completed and contracts will soon be awarded for the construction of a municipal electric light plant to cost $20,000.

A hot water heating plant and an electric light, power and refrigerating plant are to be purchased by the Sisters of the Poor of St. Francis, of Covington, Ky., who are erecting a $500,000 hospital in that city. Samuel Hannaford & Sons, Cincinnati, have plans for the institution and the Roche-Brunner Building Co., Cincinnati, has been awarded a contract for the construction.

The Tennessee Railway, Light & Power Co., which was recently taken over by H. M. Byllesby & Co., Chicago, is planning considerable extension work for its subsidiary concerns. Among these is the Chattanooga Railway & Light Co. The Tennessee company has recently purchased several small electric companies doing business in its territory and hereafter that territory will be supplied with hydro-electric current generated at the Rock Island station, or from the power on the Ocoee river. The Tennessee company is developing additional power on the Ocoee river, which, when completed, will have a capacity of 16,000 horsepower in one plant and 30,000 in a second plant.

New Construction

The Fall River Iron Works Co., Fall River, Mass., has prepared plans for extensive additions to its plant.

The Whitney Machine Co. is erecting a three-story frame addition, 54 x 84 feet, to its plant in Winchester, Mass.

Work has been commenced on an addition to the foundry of the Whitin Machine Works, Whitinsville, Mass. It will be 100 x 500 feet, and will increase the capacity 50 per cent. The present foundry is 200 x 500 feet.

The Columbus Machine & Tool Co., Columbus, O., has awarded to the McClintic-Marshall Construction Co., contracts for the erection of its foundry and office building. The estimated cost is $200,000.

The Bridgeport Brass Co., Bridgeport, Conn., is to add a new building to its plant in Housatonic avenue. It will be of brick and steel construction, one story, 50 x 360 feet, with an ell, 20 x 20 feet.

Plans have been prepared for a new pattern house for the Interstate Foundry Co., Cleveland, to be erected on its site on Roland avenue. The building will be two stories high of brick construction and 36 x 145 feet. Work will begin at once.

Plans and specifications have been submitted for the plant of the Capital-Shaw Gas Engine Co., which will remove from Sacramento, Cal., to Elk Grove, Cal. The company also owns the plant of the Bell Machine Works at Sacramento.

The Allegheny Foundry & Machine Co., Pittsburgh, will build a plant at Glassmere, Pa., adjoining that of the Allegheny Plate Glass Co. Equipment of the Roberts Boiler & Tank Co., Queens Junction, Pa., has been purchased and will be shipped to Glassmere.

The William R. Thropp & Sons Co., Trenton, N. J., has commenced the erection of a new gray iron foundry, 80 x 160 feet. It will be of steel construction and will be equipped with an 8 to 10-ton per hour cupola. It will have one 7-ton and one 15-ton electric traveling crane, the runway to be extended outside of the foundry so as to command the yard. The present foundry will be abandoned and will be replaced by an extension to the machine shop. The new foundry will be in operation some time this fall. The company manufactures rubber machinery and produces a large quantity of chilled iron rolls for rolling rubber.

The Elwood City Forge Co., Elwood City, Pa., is building an addition, 40 x 50 feet, to its plant and is extending one of its main buildings 100 feet. Considerable new equipment has been added to the plant, including a number of lathes, a 6,000-pound forging hammer, and improvements are being made to the power plant.

The Youngstown Foundry & Machine Co., Youngstown, O., is planning an extension to its Reserve street foundry. The foundry will be increased 34 x 98 feet. A shop building, now under construction, will be used for a pattern storage plant. The company recently received orders for three large spike machines from the Lackawanna Steel Co., Buffalo.

Plans have been made by Myers & Bros., Ashland, O., manufacturers of pumps and hay tools, for the erection of a storage and manufacturing building, to be constructed near the present plant, 50 x 160 feet, four stories and basement. Brick will be used in the construction. The basement will be used for storing castings, first and second floors for manufacturing, third for storing finished goods and the fourth for paint shop.

Miscellaneous

A. P. Ford, of Mayfield, Ky., will purchase an 8 or 10 horsepower upright steam boiler.

The Rex Planing Mill Co., Meridian, Miss., is in the market for refrigerating machinery.

H. R. Cook, engineer, Philadelphia, announces that an expenditure of $10,000 is contemplated for improvements at the gas plant at Fond du Lac, Wis.

Harry Kidd is operating the plant of the Chester Gray Iron & Brass Foundry Co., Chester, Pa., as a machine shop and is manufacturing a line of clam-shell dredging buckets.

The Illinois Cabinet Co., Rockford, Ill., will erect a five-story factory building, 128 x 160 feet, to cost $50,000. Considerable wood-working machinery will be required.

The National Radiator Co., Johnstown, Pa., has added a new brick foundry extension, 260 x 300 feet, to its Trenton, N. J., plant. This plant is now running 30 floors of radiators.

New Buyers

(In order to assist the post office in delivering letters to new concerns, it is suggested that the names of incorporators be written in the lower left hand part of every envelope addressed to such new companies.)

The following manufacturing companies have filed articles of incorporation:

Calhoun Pattern Foundry & Machine Co., Houston, Tex.; $40,000; by J. C. Calhoun, James Blaine, A. T. Waterman, Houston.

The Frank Pettit Ornamental Iron Co., Philadelphia; $25,000; ornamental iron; by Wm. H. Pettit, Hannah Pettit and George Lupton.

The Rochester Bridge Co., Chicago; $100,000; structural iron; by John J. Duffin, 457 East Forty-fifth street, Chicago.

Springfield Spring Co., Springfield, O.; $10,000; by Ralph H. Thacker, Alfred H. Peterson, Steven Pavelka, Elza F. McKee.

Hamel Shoe Machinery Co., Lynn, Mass.; $100,000; by directors, president, Thomas C. Rowen; treasurer, John J. Sullivan, Ipswich; Hiram E. Miller.

Ideal Steel Wheel Co., Hamilton, O.; $500,000; by J. E. Strietelmeier, A. F. Parker, D. E. Kirgan, Walter C. Taylor, James B. O'Donnell.

National Copper Refining Co., Cleveland; $250,000; by F. K. Rand, F. H. Rand, Julius Bloomberg, Eugene E. Wolf, Nathan Komito.

Sanitary Furnace Supply Co., Canton, O.; $100,000; by George D. Viers, C. N. Wilson, W. B. Dager, Rhine E. Butler, Chas. H. Nusbaum.

Eberling Cement Machinery Co., Cleveland; $100,000; by William J. Wilson, E. W. Zimmerman, M. J. Gillen, J. L. Quigley, Eugene Quigley.

Federal Chain & Mfg. Co., Springfield, Mass.; $200,000; by directors, president, Frank D. Fuller; treasurer, Eaton S. Hitchcock, Chicopee Falls; Thomas W. Irwin.

The Jones Mfg. Co., Evansville, Ind.; $10,000; safety tubes for blasting powder in mines; by John H. Jones, Jabez Worley, H. W. Matters and O. W. McGinnis.

The Curpatca Machine Co., Mishawaka, Ind.; $15,000; general machine and repair work; by L. G. Patterson, A. O. Curtis and R. F. Cotton.

General Electric Construction Co., Boston; $25,000; by directors, president, Edward Barker Jr.; treasurer, Lawrence H. Thomas, Winthrop; Richard W. Burns.

Hemsher Metal Co., Phoenicia, N. Y.; $20,000; metal working; Ralph O. L. Fay, Kanuet, Rockland county, N. Y.; Norman W. Cole, 16 Central Park W., New York City; Evan L. Tamblyn, 221 Eastern Parkway, Brooklyn, N. Y.

The Jackson Diamond Saw & Drill Co., Manhattan, New York City; $100,000; to manufacture tools for cutting and boring; by Forest S. Chilton, 1657 East Twenty-first street; Thaddeus A. Jackson, 405 Third avenue, Brooklyn; Edith L. Parker, 205 West Ninety-fifth street, New York City.

General Industrial

The Leece-Neville Co., Cleveland, has increased its capital stock from $10,000 to $100,000.

The Bingham Mfg. Co., Cleveland, has increased its capital from $25,000 to $50,000.

The Ephrata Foundry & Machine Works, Ephrata, Pa., has been sold by J. Milton Sprecher to Dr. Jacob G. Leber.

Whippe & Choate, manufacturers of brass and bronze castings, Bridgeport, Conn., have erected an addition to their plant, 91 x 178 feet.

L. C. Taylor, Morgantown, W. Va., with several associates, is reported to be looking for a location for a tin mill. The proposed plant will cost $60,000.

The Universal Swing Joint & Machine Co. has been incorporated at Louisville, Ky., with a capital stock of $100,000. The incorporators are John Bridges, B. J. Jansing and John H. Hile.

The board of directors of the Ohio Steel Co., Lima, O., has taken action for the immediate doubling of the present capacity. The plant now employs 400 men and will build to employ 800 on a single day shift.

The Key-Calk Horseshoe Mfg. Co., a new concern, has begun operating at Green Bay, Wis. Officers are: President, J. W. Bodilly; vice president, Frank Bender; secretary-treasurer, Gustav Kuestermann.

The Indianapolis Tool & Mfg. Co., Indianapolis, has been organized with a capital stock of $10,000 and will manufacture gasoline engines and tools. Members of the company are B. H. Herdink, William Herdink and Charles Herdink.

The American Gear & Mfg. Co., Jackson, Mich., manufacturer of automobile parts in quantity, advises that it has practically completed a building 250 feet square and nearly all of the machine equipment has been ordered for it.

A. M. Byers Co., Pittsburgh, which recently increased its capital stock from $1,000,000 to $1,200,000, advises that it has no plans under way at this time for any future extensions to its plants or the installation of any new equipment.

The Glacier Mfg. Co., Pittsburgh, will move its plant to Youngstown, O., where it will manufacture refrigerating machinery. J. S. Merrill, Pittsburgh, is the chief engineer. Youngstown men control the capital of the company which was recently organized.

The plant of the Kentucky Gear & Machine Co., Louisville, Ky., has been taken over by the Universal Swing Joint & Machine Co., which was recently organized in that city with a capitalization of $100,000, to engage in the manufacture of flexible steam joints.

The E. Stebbins Mfg. Co., Springfield, Mass., maker of brass fittings and plumbers' supplies at its factory in Brightwood, Mass., has made an assignment to Charles H. Downs, treasurer and manager of the plant, who expects to straighten out the affairs of the company without loss to creditors.

The Draper Co., Hopedale, Mass., manufacturer of textile machinery, has awarded the Benjamin F. Smith Construction Co., of Pawtucket, R. I., the contract for the erection of two big additions to its plant. The main building will be of wood, 160 x 140 feet, three stories high, and the other will be of brick, 90 x 50 feet.

A tractor engine, which has been perfected by officers of the Waterloo

Gasoline Engine Co., Waterloo, Ia., will be manufactured by a corporation to be organized by the company. An option has been taken on a site of 10 acres in Waterloo, and other suitable locations in that city are being looked over.

The Germantown Tool Works is having a modern manufacturing plant built at Second and Ashdale streets, Philadelphia, to replace its factory which was seriously damaged by fire last winter. Seven one-story brick and concrete buildings are connected by a central corridor, giving easy access to all departments of the plant. It has dimensions of 100 x 280 feet.

Keeton Motors Ltd., a branch of the Keeton Engine Co., New York, has been incorporated with a capital of $200,000, the provisional directors being Forrest M. Keeton, Wm. G. Houck, Wm. J. Verity and others. It will at once establish a plant at Brantford, Ont., where the old Barber & Ellis factory building on Elgin street, has been secured, and will employ 250 hands.

For the purpose of establishing a plant to engage in the manufacture of railway signal devices, the Chastteen Signal System Co. has been incorporated at Chattanooga, Tenn., with a capitalization of $200,000. W. J. Chastteen, of East Chattanooga, is president of the new company and W. P. Charlton, of Oklahoma City, Okla., is vice president.

The E. B. Lanman Co., of Columbus, O., has completed arrangements for the construction of a new bolt, nut and washer plant at Grasselli, Ind., a suburb of Chicago. The contract for the steel work on the buildings has been let to the American Bridge Co. The E. B. Lanman Co. is affiliated with the Columbus Bolt Co., Columbus, O.

The name of the Blaw Steel Centering Co., Pittsburgh, has been changed to the Blaw Steel Construction Co. The new name, the company advises, is descriptive of the work it will turn out as soon as its new plant is completed. It will take contracts to fabricate every type of steel construction. The manufacture of Blaw steel forms is and will be one of its principal products.

The Hope Webbing Co., Pawtucket, R. I., is to erect a power station, dye house and storage house, at an estimated cost of $75,000. The buildings will be of brick construction and three stories high, power house to be 80 x 44 feet, the dye house 90 x 42 feet, and the storehouse 127 x 27 feet. New boilers, electric motors and wiring will be installed.

As a result of the recent sale of 150 building lots in Columbus, Ind., supplying a guaranty fund of $45,000, the Columbus Auto Parts Co. will locate in that city and erect and equip a large factory for the manufacture of motor parts. F. H. Penfield, Jamestown, N. Y., and J. I. Handley, Indianapolis, Ind., are the leading incorporators of the $250,000 concern.

The Penn Rivet Mfg. Co., Philadelphia, advises that the contract for its new addition has been let to the Lam Building Co., Philadelphia, and work on the structure has begun. It will be approximately 70 x 100 feet and will be used as the receiving department and japanning room. The company is not in position at present to go into details regarding machinery and equipment for the addition.

The plant of the Sheriffs Mfg. Co., of Milwaukee, manufacturers of marine specialties, propellers, shafts, etc., was only slightly inconvenienced by the fire of Aug. 8 and has been operating at usual capacity since that time. The pattern shop was damaged about $7,500 and while repairs are being made the pattern work will be done in other buildings owned by the company on Barclay street.

The Ashland Foundry Co., Ashland, O., recently incorporated with a capital stock of $15,000, expects to begin building its plant at once. The company proposes to do general molding work, making all kinds of castings up to a certain size and also make patterns. Members of the firm are Robert McIntosh, Maurice Semple, Ralph Helbert, A. W. Fritzinger and Edward Helbert.

The Graf-Webb Iron Mfg. Co., Louisville, Ky., whose plant was recently damaged by fire, advises that its loss from fire and water totaled about $7,500, fully insured. The company has already purchased all the necessary machinery, electric motors and supplies required to resume operation. The foundry is now operating and the plating and mounting room probably will be in shape for some work within a few days.

The Power-Stevens Fan Devices Co. has been organized at Madison, Wis., and incorporated with an authorized capital of $150,000 for the manufacture of fans and blowers invented and designed by J. J. Power, of Madison. Joseph C. Schubert has been elected president; J. J. Power, vice president; Leroy W. Stevens, Madison, treasurer, and John E. McWilliams, Chicago, secretary; directors, John A. Aylward, Madison, and the officers.

The Read Machinery Co., York, Pa., which recently increased its indebtedness, advises that it did so to assist in payment of the plant of Norris-Burnham & Co., Glen Rock, Pa., which the Read company proposes to use in the manufacture of bakers' machinery, water wheels, etc. This plant has a foundry, machine shops, pattern shops, light plant and other accessories, which are being improved. Material has been contracted.

The Universal Shoe & Forge Co., Pittsburgh, has been incorporated with a capital of $50,000, and will begin the manufacture of horseshoes and automobile drop forgings about Nov. 1. The company expects to occupy a new plant next spring, although the site for the building has not been decided upon. Officers of the company are: C. H. Ehares, president; J. H. Wall, vice president; and P. A. K. Black, secretary and treasurer.

The Continental Radiator & Foundry Co., with factories in St. Louis, Belleville and elsewhere, has decided to increase its capital stock to $300,000, of which $200,000 will be common stock and $100,000 will be 7 per cent cumulative. The company has purchased a large and well-equipped plant in Fort Madison, Ia., and will manufacture boilers and other specialties, patents on which are controlled by the St. Louis company. Plans for the year include turning out 8,000,000 feet of radiation.

The Braeburn Steel Co., with offices and works at Braeburn, Pa., advises that the recent increase in its capital stock was made for the purpose of enabling it to carry larger stocks of raw and finished material and also to provide for certain additions and improvements. The company has doubled the size and capacity of its warehouse for finished products at Braeburn, Pa., and has opened a warehouse at 2536 Spring Grove avenue, Cincinnati. It has also increased its stock of finished products in Chicago.

Trade Notes

The Providence, R. I., office of the J. W. Paxson Co., Philadelphia, manufacturer of foundry supplies and equipment, is located at 741 Grosvenor building. W. Scott Thomas is manager of this branch.

Fires

The American Foundry Plow Co., Pittsburgh, sustained a loss of $10,000 on its buildings and stock last week, when fire broke out in an adjoining structure. Flames spread to the plant of the Penn Wheelbarrow Co. and caused considerable damage.